REFERRAL OF A PROJECT FOR A DECISION ON THE NEED FOR ASSESSMENT UNDER THE ENVIRONMENT EFFECTS ACT 1978

REFERRAL FORM

The *Environment Effects Act 1978* provides that where proposed works may have a significant effect on the environment, either a proponent or a decision-maker may refer these works (or project) to the Minister for Planning for advice as to whether an Environment Effects Statement (EES) is required.

This Referral Form is designed to assist in the provision of relevant information in accordance with the *Ministerial Guidelines for assessment of environmental effects under the Environment Effects Act 1978* (Seventh Edition, 2006). Where a decision-maker is referring a project, they should complete a Referral Form to the best of their ability, recognising that further information may need to be obtained from the proponent.

It will generally be useful for a proponent to discuss the preparation of a Referral with the Impact Assessment Unit (IAU) at the Department of Environment, Land, Water and Planning (DELWP) before submitting the Referral.

If a proponent believes that effective measures to address environmental risks are available, sufficient information could be provided in the Referral to substantiate this view. In contrast, if a proponent considers that further detailed environmental studies will be needed as part of project investigations, a more general description of potential effects and possible mitigation measures in the Referral may suffice.

In completing a Referral Form, the following should occur:

- Mark relevant boxes by changing the font colour of the 'cross' to black and provide additional information and explanation where requested.
- As a minimum, a brief response should be provided for each item in the Referral Form, with a more detailed response provided where the item is of particular relevance. Cross-references to sections or pages in supporting documents should also be provided. Information need only be provided once in the Referral Form, although relevant cross-referencing should be included.
- Responses should honestly reflect the potential for adverse environmental effects. A Referral will only be accepted for processing once IAU is satisfied that it has been completed appropriately.
- Potentially significant effects should be described in sufficient detail for a reasonable conclusion to be drawn on whether the project could pose a significant risk to environmental assets. Responses should include:
    - a brief description of potential changes or risks to environmental assets resulting from the project;
    - available information on the likelihood and significance of such changes;
    - the sources and accuracy of this information, and associated uncertainties.
- Any attachments, maps and supporting reports should be provided in a secure folder with the Referral Form.
- A USB copy of all documents will be needed, especially if the size of electronic documents may cause email difficulties. **Individual documents should not exceed 2MB as they will be published on the Department's website.**
- A completed form would normally be between 15 and 30 pages in length. Responses should not be constrained by the size of the text boxes provided. Text boxes should be extended to allow for an appropriate level of detail.
- The form should be completed in MS Word and not handwritten.

The party referring a project should submit a covering letter to the Minister for Planning together with a completed Referral Form, attaching supporting reports and other information that may be relevant. This should be sent to:

Postal address

Minister for Planning
PO Box 500
EAST MELBOURNE VIC 8002

Couriers

Minister for Planning
Level 16, 8 Nicholson Street
EAST MELBOURNE VIC 3002

In addition to the submission of the hardcopy to the Minister, separate submission of an electronic copy of the Referral via email to ees.referrals@delwp.vic.gov.au is required. This will assist the timely processing of a referral.

PART 1 PROPONENT DETAILS, PROJECT DESCRIPTION & LOCATION

1. Information on proponent and person making Referral

Name of Proponent:	GB Energy (VIC) Pty Limited
Authorised person for proponent: **Position:** **Postal address:** **Email address:** **Phone number:** **Facsimile number:**	Tim Baldwin Chief Executive Officer Level 1, 110 Church Street Hawthorn VIC 3122, Australia tb@gbenergy.com.au +61 487 888 091 N/A
Person who prepared Referral: **Position:** **Organisation:** **Postal address:** **Email address:** **Phone number:** **Facsimile number:**	Sean Dunn Regulatory and HSE Manager GB Energy Level 1, 110 Church Street Hawthorn VIC 3122, Australia sd@gbenergy.com.au Sean: 0419 560 597 N/A
Available industry & environmental expertise: (areas of 'in-house' expertise & consultancy firms engaged for project)	GB Energy have assembled an in-house team of professionals experienced in the planning, construction and operation of upstream gas assets, high pressure gas pipelines and gas processing facilities. The following consultancies have been engaged to provide specialist technical assessment and advice: • CNC Project Management: Planning, Land Access, Community Consultation and Environmental Management • Aventus Consulting: Offshore environmental risk assessment • Practical Ecology: Preliminary Ecological Assessment • Andrew Long and Associates: Concept Cultural Heritage and predictive model preparation • GHD: Gas Plant Front End Engineering & Design (FEED) Design • GPA: Pipeline Front End Engineering & Design GB Energy anticipate bringing on additional resources to assist in the preparation of the ESS process.

2. Project – brief outline

Project title: Golden Beach Gas Project

Project location: (describe location with AMG coordinates and attach A4/A3 map(s) showing project site or investigation area, as well as its regional and local context)

The Golden Beach gas field is located in Victorian state waters approximately 4km off Ninety Mile Beach, Victoria. Figure 1 provides detail of the project extent with accompanying boundary coordinates.

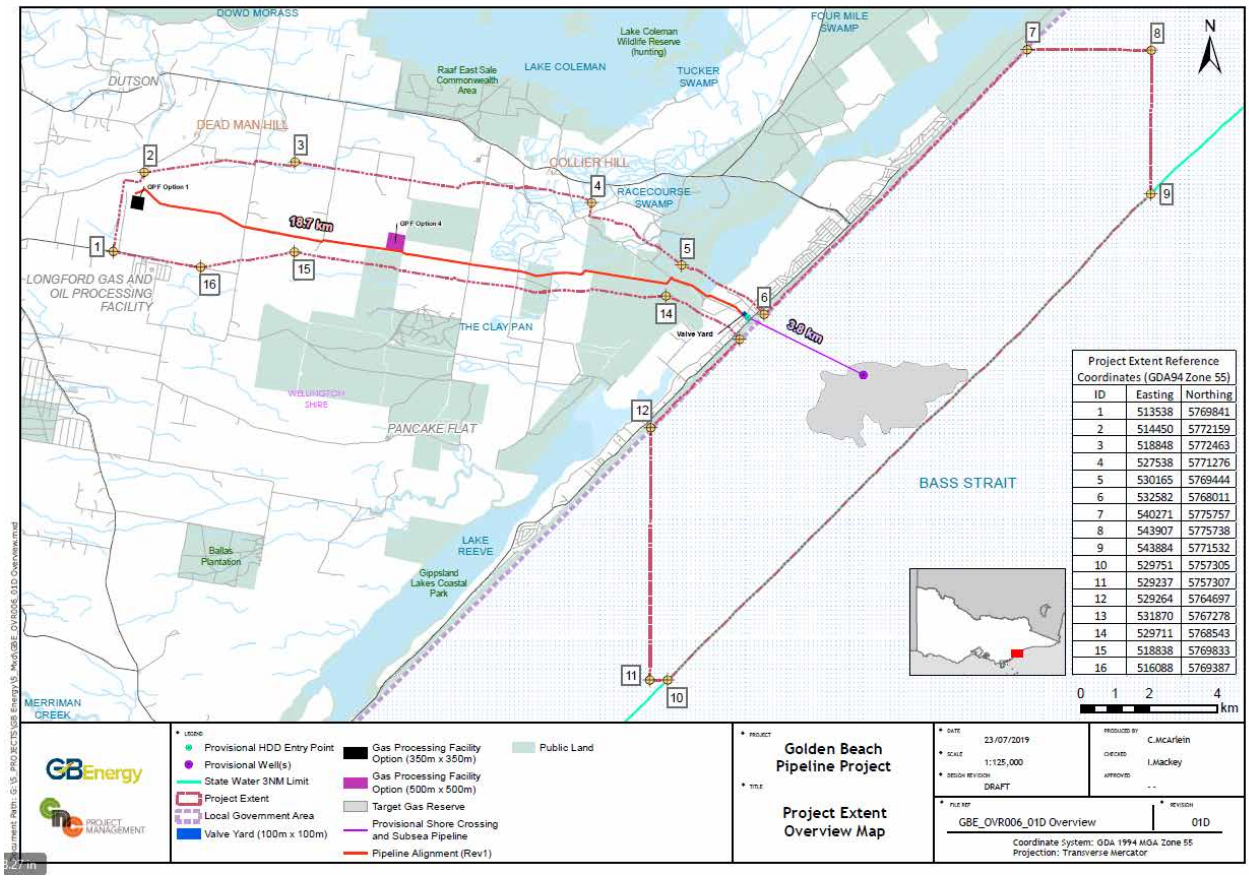

Figure 1. Golden Beach Gas Project location and extent

Short project description (few sentences)**:**

GB Energy (VIC) Pty Limited (GBE), as operator of retention lease VIC/RL1(V) (Lease), is developing the Golden Beach gas field located in the Gippsland Basin approximately 4km offshore from the Ninety Mile Beach coastline and close to Golden Beach township. The field was originally discovered in 1967.

GBE is proposing to construct and operate a pipeline and gas plant to connect the Golden Beach field to the Victorian Transmission System (VTS) (Project). The pipeline will be designed to be bi-directional, allowing for the Golden Beach reservoir, when depleted after 2-4 years, to be used as a gas storage facility with a 40-year design life. To achieve this GBE intends to drill 2 horizontal wells and conduct a testing and completion program to appraise the wells before installing subsea infrastructure (wellheads, manifolds, pipeline) to connect the gas field to the onshore facilities.

3. Project description

Aim/objectives of the project (what is its purpose / intended to achieve?):

The Project aims to appraise and develop the natural gas held in the Golden Beach gas field.

The objectives of the Project are:

1. Extract the natural gas resources within the field.

2. Process the gas and supply into existing domestic transmission pipeline infrastructure to increase gas availability to Victorian and Australian customers.

3. Following partial depletion of the gas reservoir, transition into a gas storage facility to provide Victoria and the broader domestic market with a more robust, flexible and cost-effective energy supply.

Background/rationale of project (describe the context / basis for the proposal, e.g. for siting):

Project Rationale

A network of pipelines delivers gas produced from the Gippsland Basin to processing facilities near Longford. These facilities are subsequently connected to two primary gas transmission systems that provide gas to eastern Australia and form an essential part of Australia's present and future energy supply.

Increasing gas supply and demand disparity for the domestic market has provided the impetus for renewed exploration and gas resource development activities across Australia. This has resulted in an increase in activities in the Gippsland Basin.

Following the gas blow down phase, additional equipment will be added to the Gas Plant to enable the subsea reservoir to be used as a storage facility, allowing gas to fill the reservoir during off-peak, low demand periods and then be drawn down during peak, high-demand periods.

This will support Victoria's gas market by:

- Creating greater efficiency;
- Providing security of supply; and
- Supporting intermittent renewable power.

The Golden Beach Gas Resource

The gas accumulation is in a geological structure about 5 kilometres long by 2.5 kilometres wide with a gas column of approximately 40 metres between 610 metres and 650 metres beneath the seabed. The gas is found in strata that is extensive throughout the basin and the primary reservoir rock for most of the oil and gas accumulations in the basin. The structure is sealed below 200 metres thick of impermeable calcareous claystones and marls which are in turn overlain by 200 metres to 250 metres of interbedded marls and limestones.

The Golden Beach gas field has recoverable resources in the order of 65PJ (P50). The gas is dry and sweet and the Project basis for design assumes that the gas is greater than 96% methane with no hydrocarbon liquids. This gas will require minimal treatment to reach sales quality.

The gas field is expected to produce at an initial rate of 100TJ/d declining in time with production, with a production life of around three to four years.

Once the Project is operational, a final decision will be made around the suitability and potential scale of the field to be utilised as an underground gas storage facility to enable the reinjection of gas into the wells for extraction at commercially opportune periods (for example when demand for gas is at its peak). Given the known reservoir characteristics, the Gippsland Basin aquifer performance, the use of nearby fields (Bream) by Exxon as producer storage and analogue fields such as the Iona Gas Field in the Otway Basin, it is highly likely that this will be the case. In this instance approximately 45 PJ of gas will be produced leaving 20 PJ as cushion gas in the reservoir to support storage operations.

Project Planning Background

Feasibility studies and environmental approvals for a previous iteration of the project were initially commenced in late 2001 by the then operator of the Lease, Santos Ltd (Santos). This work was suspended in the second half of 2003 but recommenced following the divestment of the asset from Santos to Cape Energy.

The project was referred in 2003 pursuant to the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) and to the Environmental Effects Act 1978 (Vic) (EE Act).

The Commonwealth regulator's response to the EPBC referral in 2003 was the project as described was "not a controlled action" provided construction of the pipeline took place when Lake Reeve was not inundated. In or about April 2003, the Victorian Minister for Energy, Industries and Resources advised Santos that the proposed development would require assessment under the EE Act.

The project was again referred by Cape Energy in 2005, for assessment against the EE Act and it was decided that an Environment Effects Statement (EES) was not required but that Cape Energy should prepare an Environment Report under the Pipelines Act 2005 (Vic) (Pipelines Act) to support necessary applications for statutory approval. The Environment Report was prepared in 2007 but never formally submitted to regulators for approval as the project failed to go to Final Investment Decision.

The retention lease (VIC/RL1(v) was transferred to GBE from Cape Energy in May 2018. GBE is now preparing to progress the Project after securing commercial agreement to sell the gas into the domestic market and subject to reservoir suitability, has entered into conditional agreements with respect to the storage of gas postproduction.

Main components of the project (nature, siting & approx. dimensions; attach A4/A3 plan(s) of site layout if available):

The main components of the Project are described here and in Figure 1 and Figure 2. The Project comprises:

1. Offshore drilling, testing and completion of two subsea wells located in the field by a jack up rig followed by installation of wellheads and tie in of subsea Christmas trees. The activity is proposed in shallow water with an expected duration of 90 days drilling and 30 days subsea construction. The project will retain an option for the drilling of a third well if required by gas stream modelling outputs during the latter stages of the project.

2. Laying 3.8km subsea pipeline and subsea infrastructure from the Golden Beach gas field to the shoreline crossing with support vessel positioning trenching and/or local rock stabilisation.

3. Shoreline crossing by HDD or Direct Pipe tunnelling for 1.3km to 1.5km adjacent to the Gippsland Water Ocean Outfall pipeline. Estimated construction duration of 120 days.

4. Onshore pipeline - construction in accordance with AS2885 for 18.5km in a 30 metre ROW from the HDD point to the proposed gas plant. Estimated construction duration 6-12 months.

5. Gas plant - proposed to be constructed over a 12-month period on a 350m x 350m compound with export metering and connection to the existing transmission pipelines.

6. Production operations – gas extraction and partial reservoir depletion at a production rate of 100TJ/day for an estimated period of 2-4 years.

7. Transition to gas storage phase and decommissioning phase – monitoring infrastructure condition and integrity and periodic in-line inspections in accordance with regulatory requirements.

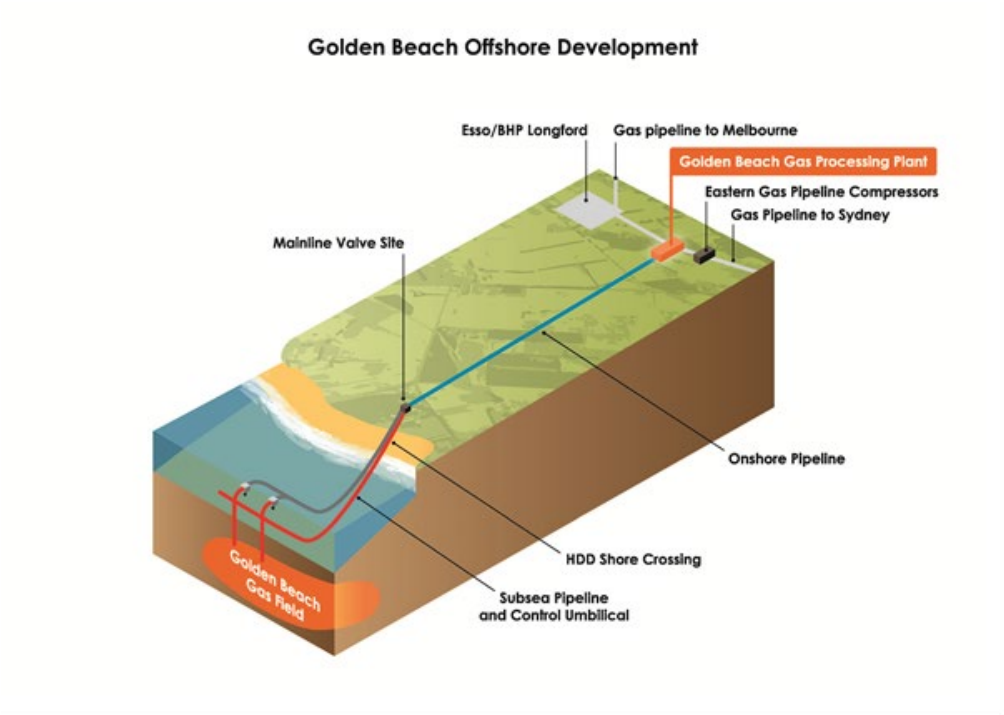

Figure 2. A schematic of the proposed development concept.

Ancillary components of the project (e.g. upgraded access roads, new high-pressure gas pipeline; off-site resource processing):

The primary access to GPF Option 1 site (refer Figure 7) is via the access road off Garretts Road Longford. This access road is a sealed road.

Construction of a new access road into the GPF Option 4 (private property-refer Figure 7) will be constructed as an unsealed gravel road designed in accordance with the AUSTROADS road design.

Key construction activities:

1. Offshore drilling by jack-up rig and support vessels (Estimated duration of 90 days)

- Drill an initial (low angle) pilot hole for the first well.
- Plugging back and drilling the well as a horizontal [production] well with subsea completions.
- Drill a second horizontal development well.
    - The base case plan is to drill two (2) subsea horizontal wells for gas extraction and storage purposes. However, detailed pressure drop modelling works on the gas flow stream may indicate that a third well is required. Therefore, a total of two (2) subsea horizontal wells may be drilled by the jack-up rig during the initial phase of drilling operations. A further well may be drilled after gas reservoir depletion, for gas storage capability.
- Drilling, completion and testing program in shallow water (<20m) will have an expected duration of ~90 days;
    - Well depths of ~650mTVD (total vertical depth)/~1500mMD (measured depth).
    - Wells to be drilled and completed to suit both drawdown and storage activities.
- Installation of wellheads and tie in of subsea Christmas trees (XMT) into offshore pipeline.
- Further details are provided in **Attachment 01 –** Field Layout Concept plan layout.

2. Pipelaying (Estimated duration of 60 – 90 Days)

- The offshore pipelaying comprises of the offshore 3.8 km subsea pipeline and control umbilical connecting to shore via a 1.3 km - 1.5km shore crossing. There are four options for offshore pipeline installation.

  - Constructed onshore, loaded onto rollers (immediate project area) and then towed out (most likely option).
  - Constructed onshore (appropriate site logistically accessible to project area) and then towed out (possible option)
  - It may be either constructed and installed from a pipe laying vessel (possible option).
  - Coiled “flexible” pipe laid from offshore vessel (unlikely option).
- Offshore pipeline activities will be dictated by forecasting suitable weather windows and on-site conditions.
- The offshore pipeline will require permanent stabilization to avoid movement. The lay route will most likely be trenched and/or rock dumping will be used to secure pipeline.
- A support vessel will position the pipeline along the lay route for connection to shore crossing.

3. Subsea Infrastructure Installation (Estimated duration of 20 days)

- The subsea infrastructure to be installed at the end of the offshore pipeline includes; Pipeline End Manifolds (PLEM), flying leads, Subsea distribution unit, infield spools, valves and well trees.
- All this equipment will be fabricated offsite and shall incorporate installation aids for installation from a construction vessel with a suitably rated crane.
- The installation of the subsea manifolds can be done by using support vessels.
- The connection of the subsea manifolds, subsea pipeline and HDD will be executed using remotely operated vehicles (ROVs) and diving services from support vessels.

4. Shore crossing (Estimated duration of 120 days)

- The 1.3km -1.5 km shore crossing adjacent to the Gippsland Water Ocean Outfall pipeline will be performed by either Horizontal Directional Drilling (HDD) or Micro-tunnelling (e.g. one pass tunnelling), consisting of either a single, or parallel drills for the gas pipeline and umbilical.
- The crossing design methodology will be subject to the actual geological conditions along the shore crossing route; thus, the most suitable drilling technology will be used. To accommodate the large pipe diameter and required corrosion and concrete weight coating, a cased HDD hole would be likely proposed.
- The techniques to be considered for the shore crossing would include:
  - Traditional HDD using a small-bore hole and a forward or back reaming run.
  - Miro-tunnelling or direct pipe techniques to provide a cased hole immediately behind the drill bit.
- A shore crossing or launch pit foundation area of 100m x 75m will be constructed and located behind the shoreline sand dune and the nominal exit point will be in approximately 10m- 12m of water depth, at approximately 750m offshore.
- An impervious lined and bunded sump will be excavated within the foundation area for HDD drilling/direct tunnelling fluids management.
- The gas pipeline will be welded onshore, loaded onto rollers and inserted through the HDD hole or Micro-tunnel, to emerge onto the seabed with a combination of pushing from onshore and pulling from offshore, the full length 3.5-4km of pipe through the drilled hole. If a pipe laying is used only a ‘tail ‘of approximately 300m for the offshore pipeline to connect the offshore pipeline into would be left.

5. Onshore Pipeline (Estimated duration of 6 - 9 months)

- Pipeline construction will comply with all relevant codes and standards including AS2885.1-2012: Pipelines – Gas and liquid petroleum (design and construction) (AS2885.1-2012) and the Australian Pipelines and Gas Association Code of Environmental Practice (APGA, 2017). The construction will also be guided by the environmental requirements to be specified in a Construction Environmental Management Plan (CEMP) to be prepared in compliance with the Pipelines Act and Pipeline Regulations 2017 and accepted by the Department of Environment, Land, Water and Planning (DELWP) prior to construction.
- The onshore pipeline extends from the shore crossing HDD entry point and travels adjacent to the existing Gippsland Water Ocean Outfall pipeline, then on to the new gas plant.

- The distance of the onshore pipeline is 18.5km which will be constructed in typical 30 metre wide construction ROW, which will connect to the offshore pipeline and tie into existing assets in Longford to enable access to the Victorian Transmission Network (VTN) and/or the Eastern Gas Pipeline (EGP) and/or the Tasmanian Gas Pipeline.
- The pipeline operates bi-directionally to allow for the future withdrawal and injection of gas into the reservoir to supply storage services to customers. Trenchless installation methods will be employed to avoid damage to sensitive areas.
- Further details are provided in **Attachment 03a –** Pipeline Process Schematic Sheet 1 and **Attachment 03b –** Pipeline Process Schematic Sheet 2.
- Please see **Attachment 04** – Onshore pipeline construction which summarises the construction process for the onshore pipeline.

As identified above, the construction footprint will typically comprise a 30m wide pipeline construction ROW, as well as extra workspace for temporary facilities to support construction. Extra workspace and temporary facilities will include:

- Access tracks (upgrade of existing and construction of new);
- Additional work areas (e.g. vehicle turn-around points, additional workspace for crossings, set up areas for alternate construction methodologies, stockpiling and storage areas); and
- Water supply tanks and temporary dams for storing water required for dust suppression and hydrostatic testing (pressure testing) of the pipeline.

The typical layout of the construction ROW is shown in Figure 3.

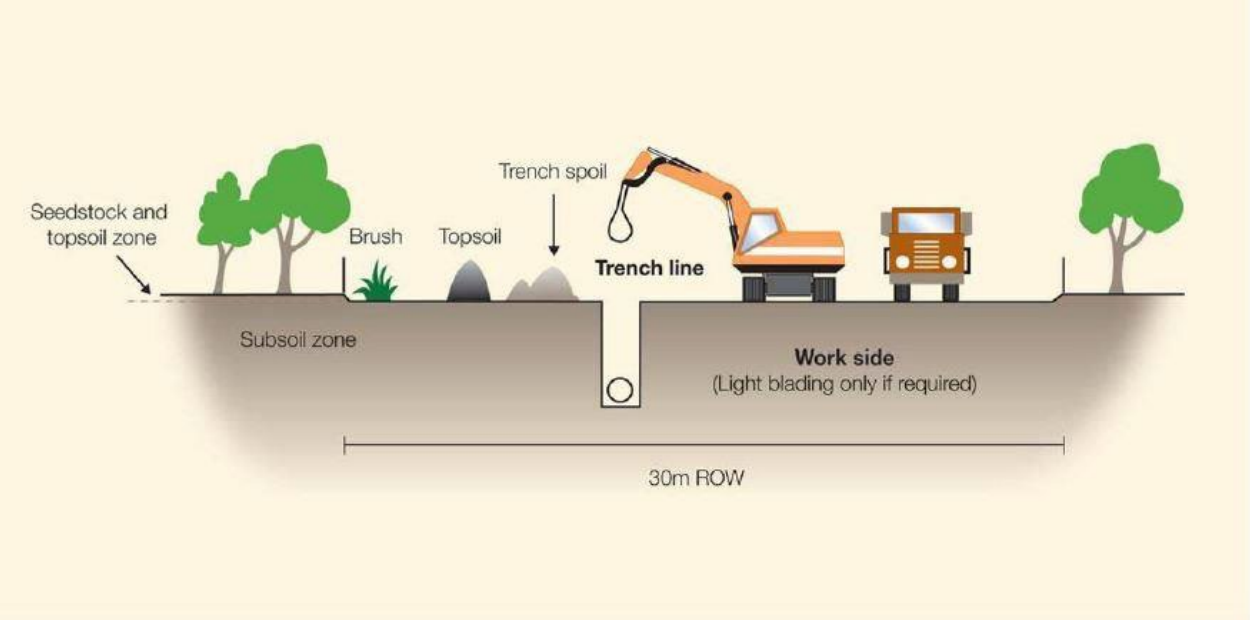

Figure 3 - Typical pipeline corridor Right-Of-Way layout

The width of the construction ROW may be reduced in areas such as sensitive environments and/or watercourses to minimise disturbance to these features. In some cases, due to the presence of areas of high ecological significance or other constraint, GBE will utilise alternate construction techniques, such as Horizontal Directional Drilling (HDD) or boring, which will negate the need for construction disturbance within the area of the alternate method.

The requirement for additional construction access tracks and working space will also be confirmed through ongoing discussions with owners and occupiers of land and further detailed engineering design. The construction ROW and all temporary facilities, temporary access tracks and extra work areas will be progressively decommissioned and reinstated on completion of the construction phase.

Onshore Pipeline construction will occur as follows:

- Surveying of the construction ROW: Surveying works are undertaken to mark the extent of approved works areas and makers are placed along the proposed alignment to identify the pipeline location.
- Installation of temporary gateways: Temporary construction gateways will be installed at every fence line that is intersected by the construction ROW to provide security for farm stock during construction.
- Clearing of vegetation from the construction ROW: Clearing of vegetation within the construction ROW will be required to provide a safe and efficient area for construction activities.
- Pipe stringing and bending: Stringing involves distributing pipe segments along the ROW in preparation for welding. Where required, pipe lengths will be bent using a hydraulic bending machine to match changes in either elevation or direction of the alignment.
- Welding: Specialised construction crews will weld pipe segments together using manual or automated welding process. Pipe segments will be welded into strings of up to approximately 1.5km in length, allowing for stock and landholder access breaks where required.
- Trench excavation: A pipeline trencher, or excavator will be used to dig the trench to lay the pipeline in. Trenches will typically be excavated to a depth of approximately 2m to achieve a depth of cover of 1.2m to the natural ground level. Topsoil and other excavated material will be stockpiled to the side of the trench area as it will be reused during backfilling activities.
- Lowering in and backfilling: the welded pipe strings will be lifted off skids and lowered into the trench using side-boom tractors. The pipe coating is inspected and tested for defects as each welded pipe string is lifted. After lowering-in, the strings are welded together (a 'tie-in') in the trench. When the pipe is in place the excavated subsoil is compacted back into the trench. The topsoil is then re-instated over the disturbed trench area to the contour of the land so that pasture or other groundcover can be rehabilitated.
- Testing and commissioning: The pipeline will be pressure tested prior to commissioning to ensure that the pipeline passes strength and leak tests.
- Rehabilitation of the ROW: Pursuant to section 145 of the Pipelines Act, landholder property must be restored as far as practicable to the purposes for which it was used prior to disturbance in relation to pipeline construction.

Special Crossing:
The crossing of Lake Reeve (Ramsar Wetland) is required during dry weather when the lake is not inundated. Lake Reeve is expected to be dry over summer, with the water table just below the surface.

Construction will be limited to between the months of November and March (inclusive) and when the bed along the route is largely dry.

Construction will only proceed when lake is visibly dry and no substantial rain has occurred in the previous 4-6 weeks.

The construction method is as follows:

- The pipeline crossing will be 250 metres long [pipe of DN700, HW (15.88mm), CWC (40mm).
- The water table is expected to be at 0.5 to 1 metres below surface (average).
- Prefabricate and preliminary hydrotest 300m long (approx) concrete coated pipe string for the lake crossing in the pipeline easement on the North side of the lake.
- Excavate across the Lake using low ground pressure excavators.
- Stockpile spoil on the East side of route across the lake (and lime treat if acid sulfate).
- Set up pipeline roller assemblies on the North side of the lake and lift the pipeline string onto the rollers.
- Attach buoyancy tubes to the pipeline string and pull into the flooded trench across the lake.
- Cut loose and recover buoyancy tubes and then backfill the trench.
- If the lake water table is too low to float the pipe across, the trench required will be narrower and the Lake surface harder. Contingency would be conventional pipeline construction on a temporary road across the Lake made from excavated spoil. Roller assemblies could also be used to assist pull of strings across the lake.
- If the lake contains surface water, trenchless installation (HDD) may be adopted. Otherwise construction will be delayed until the bed is dry.

- Following construction across the lake, the pipeline will tied-in to the conventionally laid sections on the north and south sides of the lake crossing. Above ground tie-ins may be required if bell hole construction intercepts water table.
- The crossing section will be subject to hydrostatic testing with the mainline section.

6. Gas Plant (GP) Construction (Estimated duration of 12 months)

- The proposed gas plant is to comprise simple modular dehydration and compression equipment, to dehydrate the gas and to increase the pressure of the gas to enable it to flow into the Victorian Transmission Network.
- The gas plant is to be located either within the general vicinity of EGP Compressor Station or on private owned land within or near Dutson Downs and will comprise export metering and connections to existing transmission pipelines.
- Construction will occur as follows:
    - Clearing of the plant pad;
    - Construction of the access road to the pad;
    - Construction of the hardstand and site drainage;
    - Installation of the civil foundations;
    - Installation of the mechanical equipment;
    - Installation of the pipework;
    - Commissioning of the plant; and
    - Introduction of gas into the plant.
- Further details are provided in **Attachment 02 –** Central Facility Plan**.**

7. Production Operations – Gas Extraction and Reservoir Depletion (Estimated Duration 2-4 years)

- This will involve partial extraction of the gas currently within the reservoir blow down. Installation of compression and dehydration equipment with sufficient capacity will be installed to facilitate the production of 100 TJ/day of gas from both of the subsea wells. The pipeline and facility pipework will be sized and constructed for the storage case (250 TJ/d) in the first phase of the development.
- This phase will involve gas production for the sale of gas into the Victorian Transmission Network.
- Monitoring activities - maintaining an environmental line list analysing soil stability, rehabilitation, declared noxious weeds, pests, pathogens or any environmental values identified within the pipeline corridor.

8. Transition to gas storage facility

- This will include the transition of the field into a gas storage facility providing an initial 250 TJ/day of withdrawal capacity and 125 TJ/day of injection capacity and the installation of additional/upgraded compression and dehydration equipment required to meet the increased storage flow rates will be installed during this phase of the development.
- The expansion will include the installation of additional compression (mechanical equipment) and dehydration equipment.
- All incremental activities will be contained within the footprint of the existing plant site.

9. Gas storage phase

- The subsea reservoir will be used as a storage facility, allowing customers to fill the reservoir during off-peak, low demand periods and then withdraw gas during peak, high-demand periods.
- During this phase of the development the activities will include:
    - monitoring the condition and integrity of the pipeline and its coating and major gas plant vessels and pipework.
    - periodic integrity monitoring of the pipeline (frequency to be determined).

10. Decommissioning phase

- Decommissioning of the infrastructure and abandonment of the wells following completion of use as a storage facility.
- The activities that would likely take place at decommissioning comprise the following:
    - Disconnecting pipeline,
    - Pipeline depressurisation; capping and injection of corrosion-inhibiting water

- Removal of above ground facilities
- Removal of signage
- Obtaining landowner releases and relinquishing easements.

- The offshore pipeline and facilities: involve the plugging and abandonment activities (permanent capping, cutting (where required)), flushing and retrieval of equipment with the support of ROV for offshore subsea activities).

Key operational activities:

Section 3: Key Construction Activities – subsections 7 – 9 in this document outlines the key operational activities of the Project; in short, gas production and storage.

In addition, GBE will:

- Manage the reservoir and offshore facilities in accordance with Petroleum Production License requirements and the Offshore Petroleum Greenhouse Gas Storage Act 2010.
- Observe and maintain operational plant and equipment within the Gas Plant.
- Monitor the operation of the pipeline and the pipeline easement together with effectiveness and integrity of the sub-sea wells.
- Maintain an environmental line list within the pipeline corridor.
- Operate the infrastructure in accordance with all applicable permit and licence conditions.
- Maintain regulatory reporting in accordance with licence requirements.
- Continue to review and maintain its commitment to continuing its social licence to operate in the region with directly affected landholders, stakeholders and assets owners together with the broader community.

Key decommissioning activities (if applicable):

Please refer to Section 3: Key Construction Activities – subsection 10 Decommissioning Phase in this document.

Is the project an element or stage in a larger project?

☒ No ☐ Yes If yes, please describe: the overall project strategy for delivery of all stages and components; the concept design for the overall project; and the intended scheduling of the design and development of project stages).

The development of the Golden Beach Gas Field is not part of a larger project that involves multiple fields and onshore facilities. As previously discussed, the development is however staged in two parts: gas production and gas storage.

Is the project related to any other past, current or mooted proposals in the region?

☐ No ☒ Yes If yes, please identify related proposals.

In 2003 Santos referred the proposed Golden Beach project (Santos Project) to the Commonwealth Minister for the Environment (Cth Minister) who determined that the Santos Project was not a 'controlled action', provided the construction of the pipeline will take place when Lake Reeves is not inundated. The Santos Project did not require further assessment and approval under the EPBC Act.

In 2005, Cape Energy referred the proposed Golden Beach project (Cape Energy Project) to the Victorian Minister for Planning (Victorian Minister) who advised that assessment under the EE Act is not necessary, however an Environmental Report should be prepared to support necessary applications for statutory approval. The Environmental Report is to describe the potential impacts of the proposal, as well as the proposed environment management and rehabilitation measures and is to be prepared to the satisfaction of the now Department of Environment, Land, Water and Planning (DELWP). We understand that Cape Energy subsequently prepared an Environment Report in 2007 in response to previous environmental studies with the intention to provide several reports to support the submission of an application for a pipeline licence under the Pipelines Act 2005 (Vic).

There are no material differences in the impacts between the current GBE Project and the Santos and Cape Energy Projects. Specifically, the following information in respect of the comparison of the previous referred projects with the GBE Project is highlighted below:

- Santos and Cape Energy had project descriptions that included Extended Reach Drilling; (e.g. drilling from onshore to offshore) as well as offshore drilling. GBE is focused on offshore drilling;
- All proponents are building pipelines and a gas processing plant;
- GBE will be building a larger diameter pipeline for gas storage (being a bi-directional pipeline which will allow gas to be injected back into the field for storage purposes). We understand that the pipeline will be approximately 700mm in diameter in an approximately 30m right of way/ easement but post construction the pipeline will be buried so have no impact; and
- Cape Energy did not include the gas storage component in their referral, but it has no material change on the environmental impacts.

4. Project alternatives

Brief description of key alternatives considered to date (e.g. locational, scale or design alternatives. If relevant, attach A4/A3 plans):

Project Alternatives

The following project alternatives have been considered to date or may be considered for technical, environmental or commercial reasons during the detailed planning phase of the project.

- **Offshore infrastructure**

An offshore platform was one of the options considered during early project planning but was discarded from further consideration due primarily to community issues as a structure would be clearly visible from Ninety Mile Beach.

- **Extended Reach Drilling (ERD)**

ERD wells are reviewed from time to time to look at technical, economic and schedule related matters and this continues to be an option. These wells were provided for in both previous submissions (Santos EPBC and Cape EES). If ERD was to be utilised, two wells would likely be required.

- **Well count**

The base case plan is to initially drill two (2) subsea horizontal wells for gas extraction and storage purposes. A third well may be considered or proposed in the event that market demand exists.

- **Onshore pipeline**

The pipeline will be constructed using the pre-disturbed area (e.g. Location of Ocean Outfall Pipeline and/or within the existing road corridor) for the approximate 250m crossing of the Ramsar listed area of Lake Reeve. The construction method in Section 3 for this Lake crossing recognises the need to restrict construction in response to Lake conditions.

GBE proposes to run the pipeline adjacent to other gas/water/waste pipelines in the area to minimise disturbance and to avoid the creation of new corridors where possible.

Options will be refined down to a preferred alignment through desktop and targeted field studies and landholder engagement and to ensure optimisation of the pipeline length, minimising environmental and cultural impact, incorporation of landowner considerations and sound geotechnical properties and to include in-principal tenure for its construction and operation.

The pipeline study area is made up of predominantly cleared land, which covers a large Gippsland Water owned property and parcels of private farmland (see Figure 9). This is discussed in greater detail in Section 7: Description of Proposed Site.

In accordance with the 2003/1031 EPBC Referral, GBE proposes to conduct activities across Lake Reeve only when Lake Reeve is not inundated. GBE's preferred construction method to cross Lake Reeve is via an open cut trench while the lake is dry (See Section 3 of this referral).

The Project proposes to retain an option to utilise HDD for the section of pipeline under Lake Reeve in addition to the HDD proposed at the shoreline crossing. The feasibility of HDD under Lake Reeve would be subject to further technical assessment.

- **Gas Plant**

Please refer to Attachment 01 for current Gas Plant layout options. Final location of the Gas Plant will be selected in Q3/4 2019 following environmental, technical and commercial analysis.

Brief description of key alternatives to be further investigated (if known)**:**

No further alternatives will be considered at this stage.

5. Proposed exclusions

Statement of reasons for the proposed exclusion of any ancillary activities or further project stages from the scope of the project for assessment:

No ancillary activities or further project stages have been excluded from the scope of this project, although the activities below have commenced or already been completed.

- Geotechnical and Geophysical investigations- Environmental Plan Variation (PLN-001233) for Golden Beach Geotechnical and Geophysical investigations.
- Pipeline placement survey activities and landowner access/ easement negotiations.
- The ongoing discussions with DELWP (Pipeline Regulations) regarding GB Energy's ability/inability to access land where landowners cannot be contacted for survey and access consent, and in particular those located in the Golden Beach sub-division zone.
- Onshore Pipeline survey activities including Geotechnical testing, ground proofing investigations, and ongoing field ecology Investigations.

Pending initial operations, it is possible that the capacity of the gas storage services could be increased. This would be a function of well and reservoir performance, market demand and project economics. Some elements of the development would not need to be upgraded in the first instance including the onshore and offshore pipelines.

6. Project implementation

Implementing organisation (ultimately responsible for project, ie. not contractor)**:**

GB Energy (VIC) Pty Limited

Implementation timeframe:
The current indicative staging for the delivery, construction, commissioning and operation of the Project is discussed earlier in Section 3 (Key Construction Activities).

After obtaining all necessary regulatory approvals, the Project would seek to commence construction, where possible, in Q4 2020 for a period of 12 months. The delivery timeframe of the Project has been developed to accommodate the goal of GBE to supply contracted gas to customers in Q4 2021.

Transition of the reservoir into a gas storage: Estimated – 2023 (dependent on the depletion rate of the reservoir)

7. Description of proposed site or area of investigation

Has a preferred site for the project been selected?

☒ No ☒ Yes If no, please describe area for investigation.
If yes, please describe the preferred site in the next items (if practicable).

The Project has nominated a Project Extent (refer Figure 1) within which all activities and development associated with the Project will be contained. Within the Project Extent, an 'activity area' will be nominated within which all ground disturbance activity will take place.

Three pipeline route options were identified for further assessment and one preferred route has been selected to be carried forward. Two areas are being considered for the gas plant. (see Figure 1, also provided as **Attachment 01**).

The pipeline corridor and Gas Plant options will be assessed on-ground by technical specialists over coming months. Seasonal survey and detailed technical analysis of heritage and ground conditions will provide Project planners with robust survey findings that will be used to determine the presence or absence of environmental assets within the survey corridor.

Where environmental assets are identified, the principles of avoid, minimise and offset will be applied in order to reduce environmental impact as far as is reasonably practicable and ensure that there is no net loss of native vegetation as part of the Project's development.

Attachment 11 presents the habitat requirements for the listed flora and fauna species that are likely to occur.

General description of preferred site, (including aspects such as topography/landform, soil types/degradation, drainage/ waterways, native/exotic vegetation cover, physical features, built structures, road frontages; attach ground-level photographs of site, as well as A4/A3 aerial/satellite image(s) and/or map(s) of site & surrounds, showing project footprint):

The preferred pipeline route runs from the wells directly to shore, crossing underneath the shoreline and crossing Lake Reeve approximately 1.5 km southwest of the developed portion of Golden Beach. The pipeline will then run west to terminate at a new gas processing facility to be built near the existing gas infrastructure at Longford or on privately owned land near Dutson Downs.

The Project traverses private property (farming and industry) and public land, including roadside reserves, public utilities, conservation areas and agricultural land (Figure 1).

The Project extent includes a wide range of environments, including:

- Shallow marine environments within Bass Strait;
- Beach and coastal dunes of Ninety Mile Beach;
- Coastal lakes, including seasonal wetlands, which part of the Gippsland Lakes system;
- Native forest, woodland and grasslands; and
- Agricultural land used for cropping, grazing and forestry.

The most significant environmental management areas in the project extent and surrounds are the Gippsland Lakes Coastal Park and the Gippsland Lakes Ramsar site, including Lake Reeve.

Two areas of Commonwealth land have been identified in the study area, both associated with the Royal Australian Air Force (RAAF) East Sale Base.

Topography/Landform

The offshore project area (Figure 1) comprises shallow sandy plains of the inner continental shelf (Eastern Bass Strait). The seafloor is very flat, ranging from 0 m at the shoreline to 20 m at its deepest point over 4.8 km from the coast. The wellhead location is approximately 3.8 km from shore.

Much of the seafloor is sandy sediment, with narrow, intermittent areas of low-profile calcarenite reef occurring through the nearshore area along the Ninety Mile Beach.

The pipeline will cross beneath the shore at Ninety Mile Beach, a sandy, exposed ocean beach.

The onshore landforms, as classified under the Victorian Geomorphology Framework, include coastal barrier dunes (Ninety Mile Beach), wetlands (primarily the coastal lagoons of the Gippsland Lakes) and plains with dunes (Eastern Plains).

Soil types

A desktop assessment of the Australian Soil Classifications within the study area is presented in Figure 4 - and Table 1 below. The majority of the project extent (~86%) is comprised of Podosols, agricultural use of these soils is limited because of extremely low fertility, poor water retention and the seasonal waterlogging in some forms.

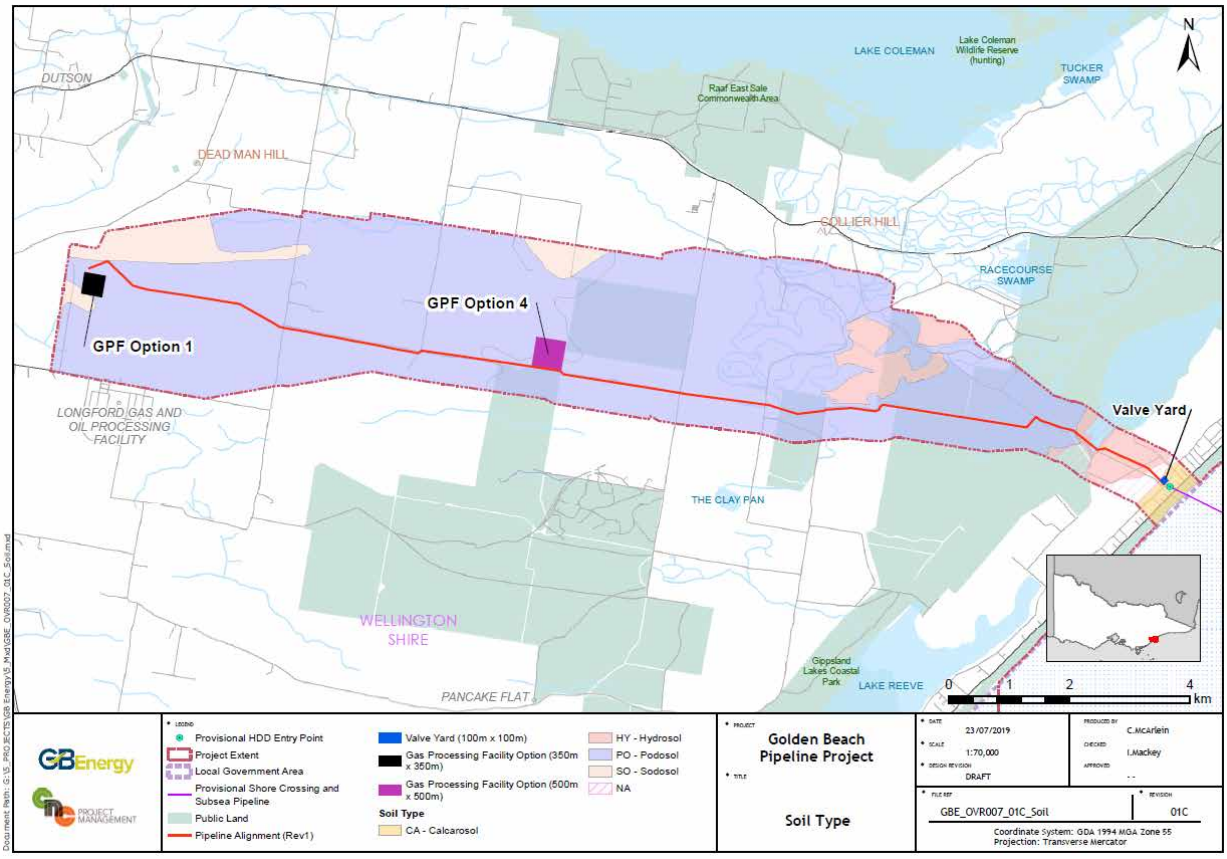

Figure 4 - Australian Soil Classification mapping within the study area

Seasonally saturated hydrosoils are associated with the margins of Lake Reeve and the Dutson Downs water treatment pondage. Further unclassified soils underlying Lake Reeve are also considered likely to be hydrosols. These soils may be potentially acid sulphate soils. Sodosols or dispersive soils make up a small portion (~5%) of the project extent. If sodic soils are intercepted by the pipeline alignment, well established management measures will be implemented through the project CEMP and rehabilitation management plans.

Table 1: Soil classification within the study area.

Soil Order	Area (Ha)	% total extent	Description
Calcarosols [CA]	48.5	1	Calcarosols contain calcium carbonate (lime), especially in the subsoil. Parent material ranges from highly siliceous, siliceous to intermediate in composition. These soils are found in imperfectly drained sites where rainfall is up 400mm and in well-drained sites with rainfall between 250mm and 500mm. Generally, they have low to moderate agricultural potential with low chemical fertility and water-holding capacity. They often have high salinity levels, alkalinity and boron toxicity.
Hydrosols [HY]	260	6	Saturated for 2-3 months or more due to site or tidal influence. Drainage of potentially acid sulfate Hydrosols can pose engineering and environmental problems and lead to acidification.
Podosols [PO]	1947	86	Agricultural use is limited because of extremely low fertility, poor water retention and the seasonal waterlogging in some forms. In the area, some podosoils are used for irrigated vegetables and grazing on improved pastures.
Sodosols [SO]	230	5	Sodosols show strong texture contrast with highly sodic B horizon but they are not highly acidic (pH > 5.5). Parent materials of Sodosols range from highly siliceous, siliceous to intermediate in composition. Generally, sodosols have very low agricultural potential with high sodicity leading to high erodibility, poor structure and low permeability. These soils have low to moderate chemical fertility and can be associated with soil salinity.
Unnamed	66	2	This area underlies the Gippsland Lakes and is not classified on the soil mapping. It is considered most likely to be further hydrosols, but requires ground truthing during the design and assess phase to verify soil type.

Sources: http://www.clw.csiro.au/aclep/asc_re_on_line/soilhome.htm http://www.soil.org.au/soil-types.htm http://www.clw.csiro.au/aclep/asc/Soil_Poster.pdf

Marine Environment

A detailed description of the marine environment along the proposed offshore pipeline route and around the nominated drill location is provided in the Geophysical and Geotechnical Environment Plan (accepted by the ERR in April 2019).

LiDAR (Light Detection and Ranging) derived data on the sediments of the nearshore Victorian coastline indicates that the majority of the seabed in the region comprises sandy sediments. A series of sand waves, running perpendicular to the coast, are present.

Intermittent and very narrow areas of low-profile reefs (about 0.5 m to 1.5 m in height above the surrounding seabed), running parallel to the coast, are scattered through the nearshore sandy sediments along the Ninety Mile Beach. These reefs comprise calcarenite and occur immediately behind the surf zone, in water depths ranging from 7 to 25 m (Burton *et al*., 2012), and are likely to be often covered by mobile sand.

A marine habitat assessment was commissioned by CarbonNet for their Pelican 3D marine seismic survey (MSS) and conducted in early April 2017 to characterise the seabed. Of the 71 sites sampled in the habitat assessment Pelican MSS area, two sites occur within GBE's activity area (CarbonNet, 2018). These sites, and those surrounding them, indicate that the seabed in the activity area is dominated by soft sediments (sand).

Waterways
Refer to Figure 5 and Figure 7 for a map of waterways and wetlands in the project area.

Coastal Lagoons
Lake Reeve_is an extensive intermittent saline wetland providing a highly significant habitat for large numbers of migratory waders. Lake Reeve forms part of the Ramsar listed Gippsland Lakes, a group of coastal lagoons in eastern Victoria, separated from the sea by sand dunes and fringed on the seaward side by the Ninety Mile Beach.

Waterways and wetlands
Waterways and wetland habitats within the project extent include farm dams, waste water channels and treatment lagoons, drainage lines and low land depressions. There are no rivers or permanent watercourses intersected by the proposed pipeline route or either of the proposed gas plant locations.

Waterways that depend on natural waters sources are predominantly ephemeral. The waste water treatment lagoons in Dutson Downs provide permanent, deep and well vegetated wetland habitat and are adjacent to, but not directly on, the proposed pipeline alignments.

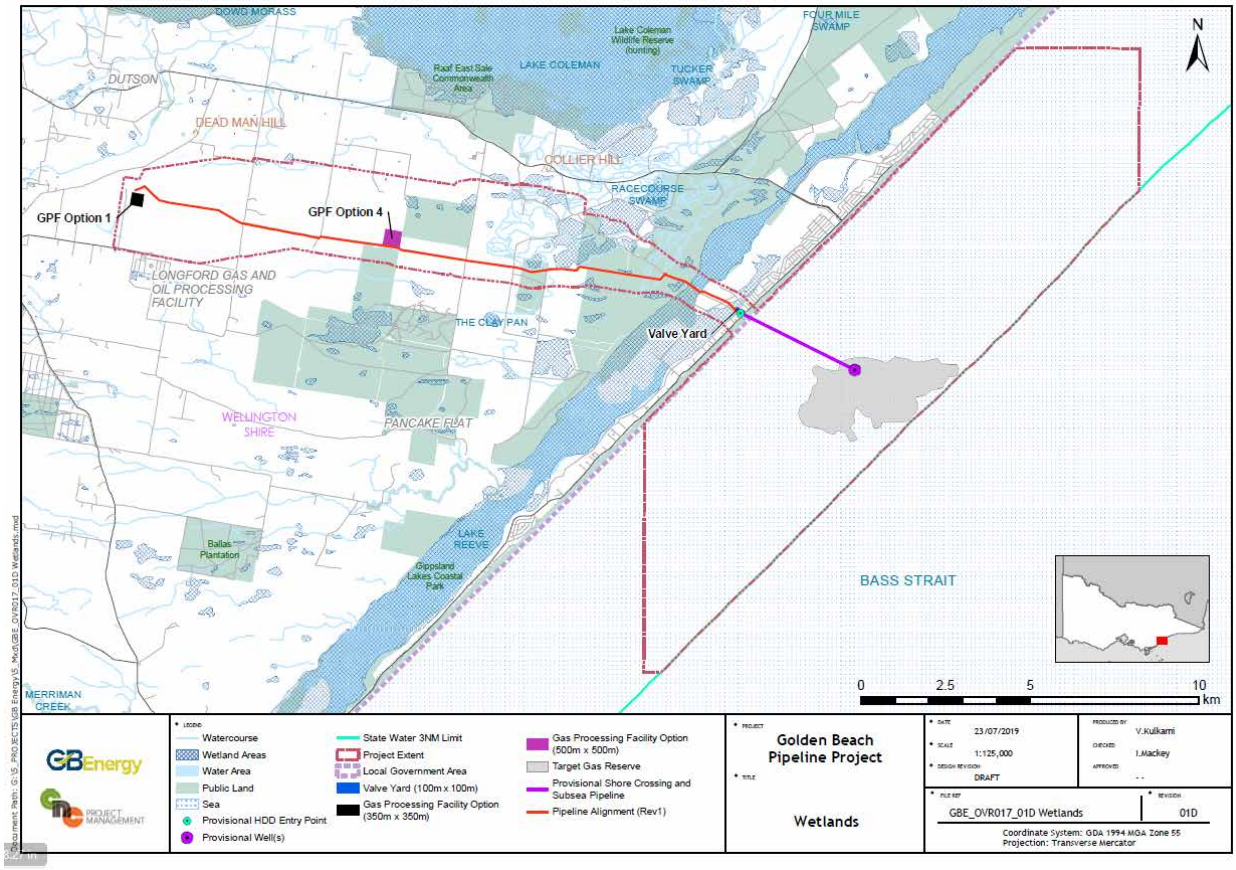

Figure 5 – Wetlands in relation to the project area

Vegetation cover
The majority of the vegetation cover within the project extent is used for agricultural activities including grazing and forestry plantation.

The coastal dunes between Ninety Mile Beach and Lake Reeve are dominated by coastal scrub and dense burgan (Kunzea sp.) regrowth following earlier land clearing.

Areas of Coastal Banksia Woodland occur on the secondary and tertiary dunes behind the beach and adjacent to Lake Reeve. Coastal Saltmarsh is also associated Lake Reeve. The plains behind the coast support remnant patches of woodland and lowland forest.

Built structures
Apart from the township of Golden Beach, coastal development within the vicinity of the Golden Beach Project includes over 11,000 subdivided lots along the Ninety Mil Beach between Paradise Beach and the Honeysuckles, east of Seaspray. Most lots remain undeveloped. These lots occur both on the sand dunes of the Ninety Mile Beach and on the adjacent sandy soils. Part of this subdivision extends into Lake Reeve itself. None of the lots are connected to reticulated water or sewerage systems and the future development of these lots is considered unknown.

West of Lake Reeve, buildings and infrastructure are sparse and include isolated farmhouses and outbuildings. Gippsland Water's Dutson Downs wastewater and waste treatment facilities occupy approximately 6000 hectares in this area. The EGP Compressor Station, APA's (GasNet) Victorian Transmission System (VTS) and associated metering station and Esso's Longford GPF and Heliport are located approximately 17 kilometres west of the Golden Beach town and are central to a network of buried oil and gas gathering system and transmission pipelines which traverse the regional landscape.

Site area (if known):

- Overall Project Extent (onshore – 4500. 29 hectares; offshore - 10900.73 hectares, VIC/RL1)
- Gas Plant Facility footprint within project extent - 500 metres by 500 metres or 25 hectares.
- Shore Valve Facility footprint within project extent – 100 metres by 100 metres or 1 hectare.

Route length (for linear infrastructure):

- Preferred onshore pipeline route: 18.7km
- Offshore pipeline: 3.8km

and width

- 30 (m) maximum during construction – the width of the activity area can be reduced through areas of sensitivity by adopting an alternative construction methodology (typically slower and more expensive, hence why this isn't the standard methodology). At the completion of construction, the construction right of way (CROW) will be reinstated and returned to existing use, with an easement of 20 m width retained for operational purposes.

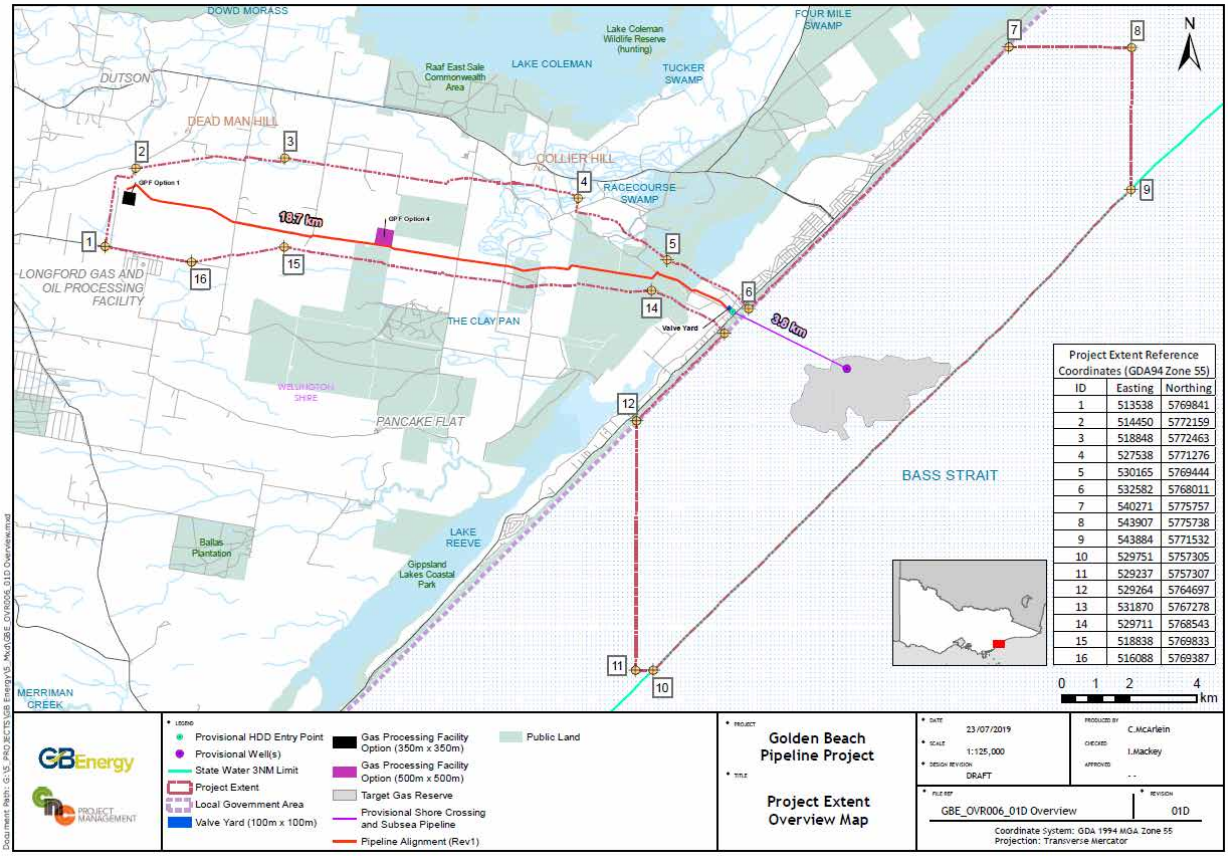

Figure 6. Infrastructure siting options, distances and areas.

Current land use and development:

There are four land use types across the project extent.

- Privately owned land including farming and industry;
- Gippsland Water owned land;
- Other Shire, State or Federally owned land;
- A subdivision that is currently subject to a review by the State Ombudsman.

Refer to **Figure 7** for planning zone maps related to this project.

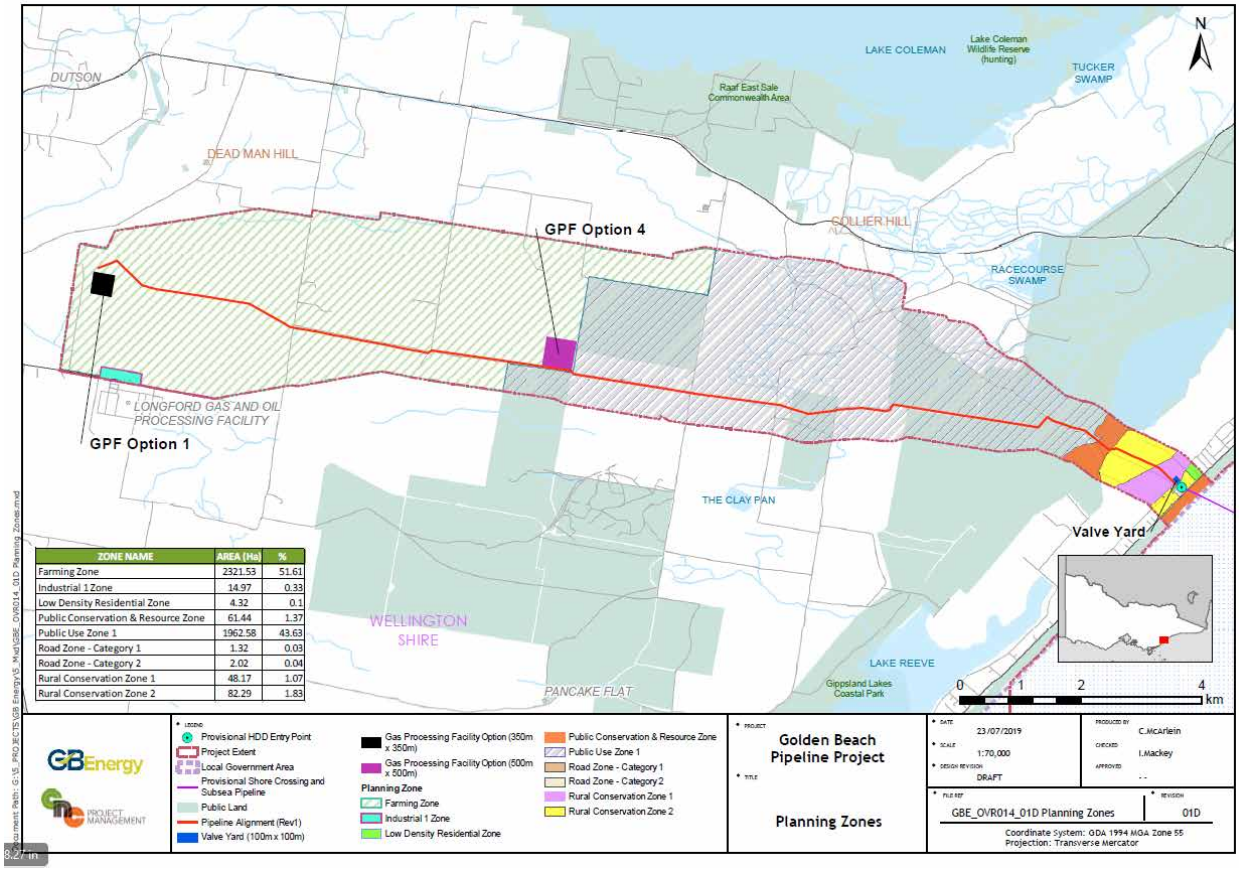

Figure 7 – Planning Zones for the Project

Description of local setting (eg. adjoining land uses, road access, infrastructure, proximity to residences & urban centres):

The onshore components of the proposed development are located on lands under the jurisdiction of the West Gippsland Catchment Management Authority, and the local government authority is the Wellington Shire Council.

The prosperity of the Wellington Shire is largely supported by agriculture, forestry, fishing, oil and gas, government/administration, defence and education sectors. Victorian-managed commercial fisheries with access licences that authorise harvest in the waters of the vicinity of the Project are described in **Figure 8** and further detail in Section 13.

The main townships in the district are Longford, and the coastal settlements of Golden Beach, Paradise Beach and Delray Beach. The combined permanent population of the district is estimated to be around 1,500 people, but the population of the coastal towns swells to several thousand during the holiday season over summer. The majority of houses are located at Paradise Beach and Golden Beach, with fewer houses located at Delray Beach. There are a number of caravans on blocks of land along the coastline.

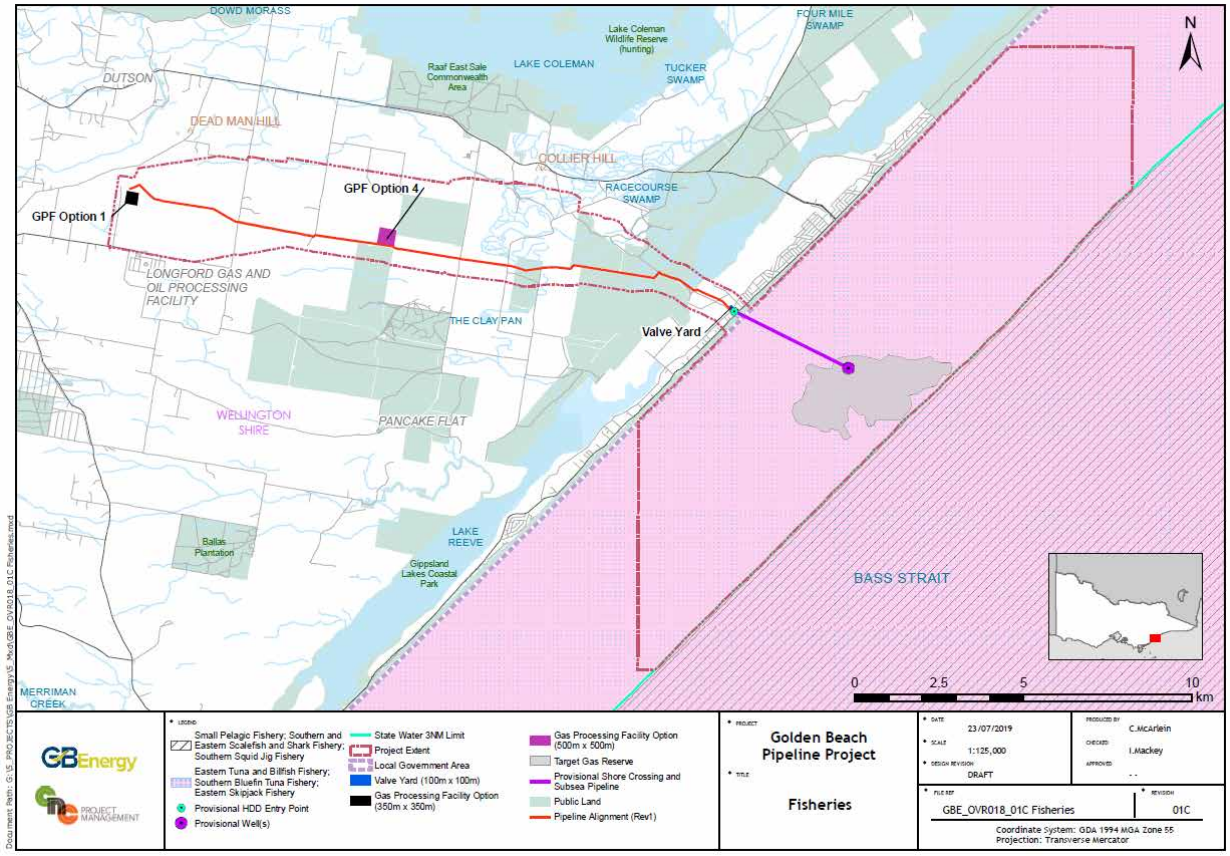

Figure 8 – State Fisheries

Apart from the township of Golden Beach, coastal development within the vicinity of the Golden Beach Project includes over 11,000 subdivided lots along the Ninety Mile Beach between Paradise Beach and the Honeysuckles, east of Seaspray. Most lots remain undeveloped. These lots occur both on the sand dunes of the Ninety Mile Beach and on the adjacent sandy soils. Part of this subdivision extends into Lake Reeve itself. None of the lots are connected to reticulated water or sewerage systems and the future development status of these lots is unclear.

West of Lake Reeve, buildings and infrastructure are sparse and include isolated farmhouses and outbuildings. Gippsland Water's Dutson Downs wastewater and waste treatment facilities occupy approximately 6000 hectares in this area.

Refer to **Figure 9** for a map of activities in the region, noting Gippsland Water land ownership.

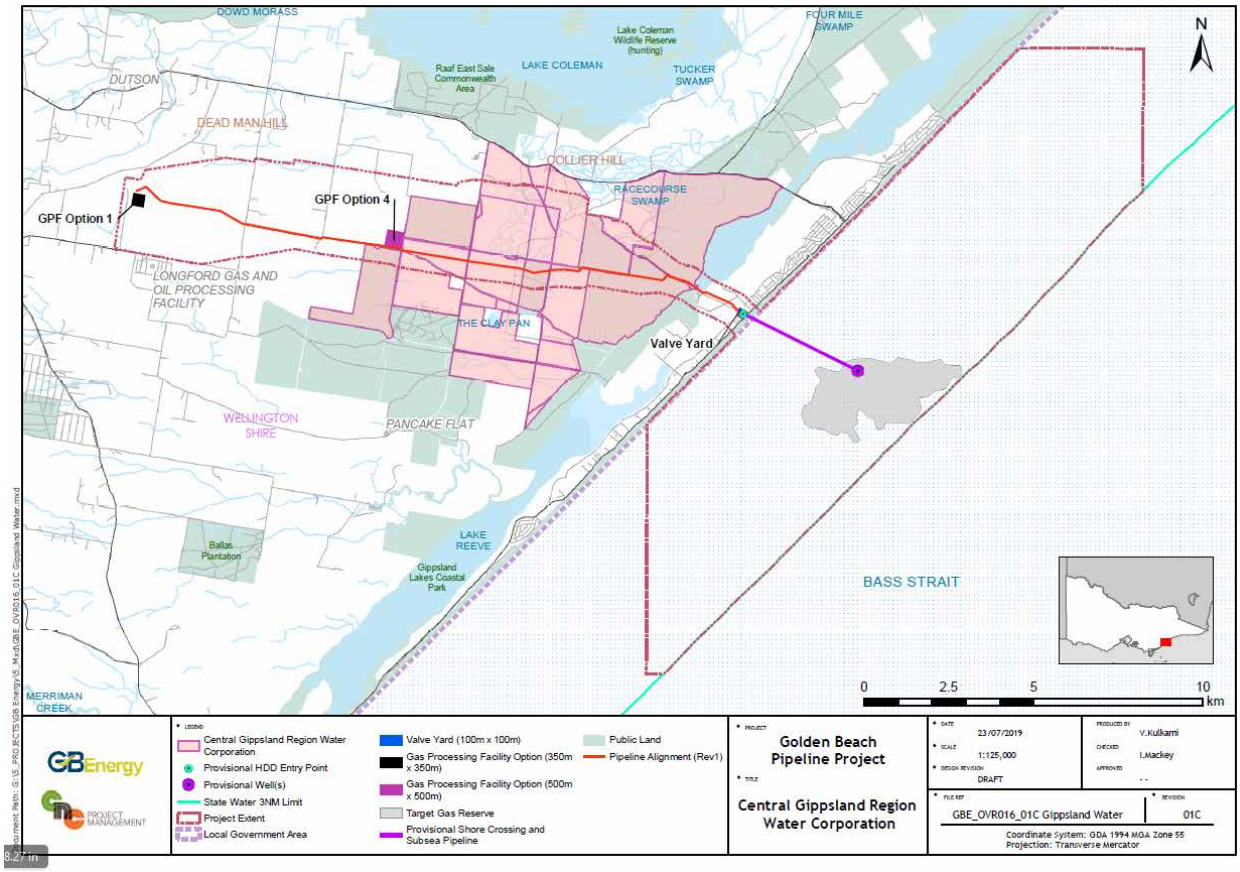

Figure 9 – Gippsland Region Water Corporation

Planning context (eg. strategic planning, zoning & overlays, management plans):

Strategic Planning

Offshore well(s) and subsea pipeline

The Offshore Petroleum and Greenhouse Gas Storage Act 2010 is the key legislation for offshore infrastructure and pipelines. Application will be made to the Minister for Resources for a licence to construct and operate the offshore production wells and pipeline in accordance with this legislation.

Onshore Pipeline
Section 85 of the Pipelines Act provides an exemption from the need to obtain planning approvals under the *Planning and Environment Act 1987*.

Gas Plant
The Gas Plant will likely be constructed in a location zoned Public Use or Farming and a planning scheme amendment for the GPF site will be sought to allow this development to take place.

Zoning and Overlays
Figure 7 provides a map of the planning zones in relation to the project corridor and Table 2 and 3 list the planning zones and associated planning overlays within the project extent and project footprint.

Table 2. Planning zones within the Project Extent and Project Footprint

ZONE NAME	Project Extent		Project Footprint	
	Area (Ha)	%	Area (ha)	% within this zone
Farming Zone	2321.53	51.61	61.33	0.03
Industrial 1 Zone	14.97	0.33	0.00	0.00
Low Density Residential Zone	4.32	0.1	0.00	0.00
Public Conservation & Resource Zone	61.44	1.37	0.76	0.01
Public Use Zone 1	1962.58	43.63	25.33	0.01
Road Zone - Category 1	1.32	0.03	0.00	0.00
Road Zone - Category 2	2.02	0.04	0.00	0.00
Rural Conservation Zone 1	48.17	1.07	1.59	0.03
Rural Conservation Zone 2	82.29	1.83	1.36	0.02

Table 3. Planning Overlays within the Project Extent

SCHEME CODE	Planning Overlay	Project Extent	Project Footprint	
		Area (ha)	Area (ha)	% within this Overlay
DDO	Design & Development Overlay 1	1.04	0.00	0.00
DDO	Design & Development Overlay 13	4.37	0.00	0.00
DDO	Design & Development Overlay 6	2214.29	61.28	0.03
ESO	Environmental Significance Overlay 1	139.89	3.31	0.02
ESO	Environmental Significance Overlay 2	107.62	2.22	0.02
LSIO-FO	Flood Overlay	86.55	2.05	0.02
LSIO-FO	Land Subject to Inundation Overlay	85.97	2.24	0.03
RO	Restructure Overlay	91.75	1.71	0.02
SLO	Significant Landscape Overlay 1	15.11	0.00	0.00
WMO	Wildfire Management Overlay	1708.66	46.07	0.03

Local government area(s):

The only local government area relevant to the Project Extent and the Project is the Wellington Shire Council Local Government Area.

8. Existing environment

Overview of key environmental assets/sensitivities in project area and vicinity
(cf. general description of project site/study area under section 7)**:**

Key environmental assets identified through desktop searches and literature reviews for the project area and vicinity include:

- Matters of National Environmental Significance
- Native flora and fauna
- Aboriginal and cultural heritage

- Historic heritage
- Waterways and Wetlands, including the Gippsland Lakes Ramsar site – Lake Reeve.

Matters of National Environmental Significance
Three threatened ecological communities listed under the EPBC Act were recorded within 5km of the project area - Gippsland Red Gum Grassy Woodland and Associated Native Grassland (Critically Endangered); Natural Damp Grassland of the Victorian Coastal Plains (Critically Endangered); and Subtropical and Temperate Coastal Saltmarsh (Vulnerable). Temperate Coastal Saltmarsh was recorded in the study area during reconnaissance surveys in April 2019.

Native flora - 24 nationally significant flora species were recorded in the Victorian Biodiversity Atlas and Protected Matters Search Tool (PMST) as occurring within a 5 km radius of the project area. Field surveys have confirmed the presence of eight vegetation classes in the Project area. Areas of Coastal Banksia Woodland (EVC0002) and Coastal Dune Scrub (EVC0160) occur on the secondary and tertiary dunes behind the beach and to the edges of Lake Reeve (Waterbody – Fresh - EVC0992). Estuarine Wetland (EVC0010) and Coastal Saltmarsh (EVC0009) are also associated Lake Reeve. A small area of Swamp Scrub (EVC0053) is associated with a small wetland behind Lake Reeve. The plains behind the coast support areas of Heathy Woodland (EVC0048) and Damp Sands Herb-rich Woodland (EVC003), with patches of Lowland Forest (EVC0016).

Table 4 below identifies native flora that are likely to occur within the project area. These species are being targeted in field surveys.

Native fauna – The onshore project area includes potentially suitable habitat for listed fauna species. Desktop studies identified 72 state or nationally significant fauna species were recorded in the Victorian Biodiversity Atlas and PMST as occurring within a 5 km radius of the project. A total of 33 birds, five fish species, two frog species, four terrestrial mammals, three whale species, three marine turtle species and eleven flora species are predicted to occur in the project area. A further suite of migratory and listed marine birds and other marine fauna species, and five migratory terrestrial bird species, are also predicted to occur. In total, there are 63 listed threatened species, 45 listed migratory species, and 80
listed marine species predicted to occur within 5 km of the project area. These are described in further detail in the preliminary pipeline options analysis ecology study in **Attachment 09**.

Table 4 below identifies native fauna that are likely to occur within the project area. These species are being targeted in field surveys.

Further information about native flora and fauna is provided in Section 12.

Aboriginal and cultural heritage – 21 registered Aboriginal cultural heritage places were located within the one kilometre of the activity area. Four registered places are situated within the activity area. Gunaikurnai Land & Waters Aboriginal Corporation (GLaWAC) have been actively consulted in the planning of the Project.

Further information about aboriginal and cultural heritage is provided in Section 15.

Historic heritage - No cultural heritage places listed on the Heritage Register or the Archaeological Inventory have been identified in desk top searches. There are no heritage overlays in the study area under the Wellington Planning Scheme. A search of the Victorian Heritage Database did not identify any significant heritage places or objects in the area and a search of the marine heritage register did not identify any shipwrecks or other maritime cultural heritage sites in the vicinity of the Project.

Waterways and wetlands - The pipeline corridor intersects four watercourses – two channel drains, one connector stream and a watercourse. None are named. Wetland habitat, consisting of farm dams, water treatment lagoons, drainage lines and moist depressions provide habitat for a range of fauna, particularly wetland birds, reptiles and amphibians. Deep, well-vegetated lagoons at the Dutson Downs treatment plant support a larger number and variety of wetland birds and waterfowl, as well as habitat for the threatened Green and Golden Bell Frog *Litoria aurea*. Farm dams provide frog habitat, but most dams were dry at the time of the site assessment. Tea-tree swamps and boggy areas around swamps and farm dams provide potential habitat for ephemeral pond-breeding frog species such as the Southern Toadlet. These swamps were dry during the surveys and will only support breeding if they become inundated with autumn/winter rainfall.
Further information about waterways and wetlands are provided in Section 13.

Table 4. Field Survey Targets - Terrestrial/Estuarine Flora and Fauna Species likely to occur in project area

Scientific Name	Common Name	Likelihood of Occurrence	Listed Under:		
			EPBC	FFG	VROTS
FAUNA SPECIES					
Botaurus poiciloptilus.	Australiasian Bittern	mod	EN	L	e
Cercartetus nanus	Eastern Pygmy Possum (EPP)	high	-	R	n,t
Dromaius novaehollandiae	Emu	high	-	-	n,t
Galaxiella pusilla	Eastern Dwarf Galaxias	Low	VU	L	e
Isoodon obesulus obesulus	Southern Brown Bandicoot (SBB)	mod	ED	L	n, t
Lissolepis coventryi	Swamp Skink	mod	-	L	v
Litoria aurea	Green and Golden Bell Frog	mod	VU	R	v
Litoria raniformis	Growling Grass Frog	high	VU	L	e
Pseudemoia rawlinsoni	Glossy Grass Skink	high	-	-	v
Pseudomys novaehollandiae	New Holland Mouse (NHM)	high	VU	L	v
Pseudophryne semimarmorata	Southern Toadlet	high	-	-	v
Uperoleia martini	Martin's Toadlet	high	-	L	c,e
Varanus varius	Lace Monitor	high	-	-	e
(e.g. Freckled Duck *Stictonetta naevosa*, Blue-billed Duck *Oxyura australis*)	Waterbirds	mod high	- -	L L	e e
(e.g. Hooded Plover *Thinornis cucullatus*, Curlew Sandpiper *Calidris ferruginea*, Eastern Curlew *Numenius madagascariensis*)	Shorebirds	mod mod low	VU CR CR	L - -	v e v
FLORA SPECIES					
Bossiaea heterophylla	Variable Bossiaea	mod	-	-	r
Commersonia prostrata	Dwarf Kerrawang	high	EN	L	e
Dodonaea procumbens	Trailing Hop-bush	high	VU		v
Eucalyptus arenicola	Gippsland Lakes Peppermint	high	-	-	r
Eucalyptus willisii s.s.	Promontory Peppermint	high	-	-	r
Lomandra glauca s.s.	Blue Mat-rush	mod	-	-	k
Maroon Leek-orchid *Prasophyllum frenchii*, Metallic Sun-orchid *Thelymitra epipactoides* Shy Sun-Orchid *Thelymitra planicola*	Orchids	high mod mod	EN EN -	L L -	e e k
Prostanthera galbraithiae	Wellington Mintbush	high	VU	L	v
Thryptomene micrantha	Ribbed Thryptomene	high	-	-	r
Zieria veronicea subsp. veronicea	Pink Zieria	low	-	-	r

Source: Practical Ecology – Attachment 09 of this referral.

Key:

Conservation status under EPBC Act 1999:		*Conservation status under FFG Act 1988:*		*Victoria Rare or Threatened Species (VROT) (DEPI 2014):*	
extinct	*EX*	*listed*	*L*	*presumed extinct*	*x*

critically endangered	*CR*	*nominated*	*N*	*endangered*	*e*
endangered	*EN*	*rejected*	*R*	*vulnerable*	*V*
vulnerable	*VU*	*delisted*	*D*	*rare*	*R*
conservation dependent	*CD*	*invalid*	*I*	*poorly known*	*k*

Table 5. Likelihood of regular occurrence: categories and definitions.

Likelihood	Example of definition
High	Known or likely to maintain resident populations in the local area (<5 km), previously recorded on the site or frequently recorded in the local area (<5 years), preferred habitat present within the site.
Moderate	Previous records in the local area (<5 km, <10 years), likely to move through the site or visit seasonally, unlikely to maintain a population within the site but may contribute to the home range of individual animals, some characteristics of preferred habitat are present although may have been modified.
Low	Few previous records in the local area (5 km, <25 years), species may occur rarely or as opportunistic visitor, few characteristics of preferred habitat or highly modified.
Unlikely	No species records in the local area (<5 km) or few records, >25 years old, no suitable habitat present in the site or immediately surrounding area, beyond the species natural distribution or locally extinct.

Matters of National Environmental Significance - Offshore Marine Environment

Golden Beach Energy has an accepted Environment Plan for an activity operating on the same offshore project footprint as the proposed activity. The following material is drawn from the accepted Golden Beach Geophysical and Geotechnical Investigations Environment Plan.

Commonwealth marine reserves - The Beagle Australian Marine Park and East Gippsland Australian Marine Park are located 96 km southwest and 215 km east-south-east respectively of the project area. Neither of these AMPs are located within the project extent, as such, they are not further described here.

World-Heritage Listed Properties - No properties on the World Heritage List occur within the project extent.

National Heritage Listed Places - There are no National Heritage-listed places in Bass Strait.

Wetlands of International Importance – The proposed pipeline route between the gas plant and the shoreline crossing passes through the coastal saltmarsh and associated saltpans/ephemeral wetland of Lake Reeve, part of the Gippsland Lakes Ramsar Site. See Section 13 of this referral.

Threatened Ecological Communities - The nearest TEC to the project area is the Giant Kelp Marine Forests of South East Australia, mapped as possibly occurring within the nearshore parts of eastern Gippsland. Mapping conducted for the related accepted geophysical and geotechnical investigations EP indicates that this TEC does not occur within the activity area (with the nearest occurrence being east of the mouth of the Snowy River, 111 km northeast of the activity area and 63 km northeast of the nearest boundary of the EMBA). As such, further description of this TEC is not provided here.

Commonwealth Heritage-Listed Places - No properties on the Commonwealth Heritage List occur within the EMBA. The nearest places are the Wilsons Promontory Lighthouse (128 km southwest of the activity area) and the Gabo Island Lighthouse (232 km northeast of the activity area).

Key Ecological Features - The project extent does not intersect the western-most portion of the 'Upwelling East of Eden' KEF (it is located 1.5 km to the east).

Marine Species

Fish - There are 34 fish species (28 of which are seahorses and pipefish) recorded in the EPBC Act PMST as potentially occurring in the activity area (G&G Investigations EP, April 2019). A search of the VBA database reveals no recordings of fish species in the EMBA.

Cetaceans - The PMST indicates that eight whale species and six dolphin species may reside within or migrate through the activity area. A description of species is listed in Table 5.8 of the related G&G Investigations EP. A search of the VBA database indicates that the southern right whale, humpback whale, killer whale, common dolphin and bottlenose dolphin have been recorded in the greater offshore marine environment.

Pinnipeds - There are two pinniped species recorded under the EPBC Act PMST as potentially occurring within the activity area [New Zealand fur-seal; Australian fur-seal]. These species are not listed as threatened under the FFG Act. The VBA database contains no records for pinnipeds in the EMBA.

Turtles - Three species of marine turtle are listed under the EPBC Act as potentially occurring in the activity area [loggerhead, green and leatherback]. No turtles are listed as threatened under the FFG Act 1988 (Vic), except for the leatherback turtle. The VBA database does not include any recordings of turtles within the greater offshore area however the eastern snake-necked turtle (*Chelodina longicollis*) is identified in association with freshwater habitat.

Avifauna - Seventy (70) bird species (seabirds and shorebirds) are listed under the EPBC Act as potentially occurring in the activity area and greater offshore area. The majority of these are listed as migratory and marine species. The VBA database records 11 seabirds and 31 shorebirds from the EMBA, with another 140 terrestrial birds also recorded.

Reserves and Marine Protected Areas

Gippsland Lakes Coastal Park

The Gippsland Lakes Coastal Park is the only State reserve within the study area. It includes Ninety Mile Beach and much of the coastal lagoon and dune systems of the Gippsland Lakes. It is administered jointly by Parks Victoria and the Gunaikurnai Traditional Owner Land Management Board. The proposed pipeline will likely intersect the reserve at two locations: the shore crossing; and the crossing of Lake Reeve.

Lake Reeve is an extensive intermittent saline wetland and saltmarsh providing a highly significant habitat for large numbers of migratory waders. Shallow water levels and regular (seasonal) filling of the lake and inundation of its margins generate saltmarsh that provides summer feeding and roosting grounds for migratory waterbirds of international importance. Lake Reeve holding the following ecological characteristics:

- Geomorphology: As noted in the Ecological Character Description of the Gippsland Lakes Ramsar Site (DSEWPAC March 2010), Lake Reeve also differs fundamentally from other lagoons in the Gippsland Lakes in its geomorphology. The bed of Lake Reeve is of sand, shell and mud, and as large areas of the lagoon frequently dry up completely, extensive saltmarsh areas develop. Along much of the shoreline of Lake Reeve, are sets of low, curving parallel ridges, the ridge crests commonly only five centimetres to 30 – 40 centimetres above the intervening swales. The ridges are often shelly, or of silty sand. They indicate a progressive reclamation of Lake Reeve by shoreline progradation and have been termed contraction ridges or concentric ridges. They are best developed on the eastern shoreline due to the predominance of wave action here generated by westerly winds. For these reasons Lake Reeve is identified as a geological and geomorphological site of State significance (DPI 2007) and is an excellent representative hypersaline saltmarsh that is both rare and unique in the context of the bioregion/drainage division and at greater spatial scales.

- Hydrology - Lake Reeve is periodically inundated with saline water and then dries out to form an intermittently wet-and-dry saltmarsh environment. Water enters Lake Reeve from the eastern end near Lake Victoria and permanent water extends westwards for about 13 kilometres. Water levels in Lake Reeve are usually lowest in summer and early autumn when stream flows are low but may be tens of centimetres above sea level during floods. Only the eastern end of Lake Reeve contains permanent water. The rest of the lake is shallow and usually dries up by early summer.

- Ecology: Lake Reeve differs fundamentally from other lagoons in the Gippsland Lakes. The floor of Lake Reeve is of sand, shell and mud, and as large areas of the lagoon frequently dry up completely, extensive saltmarsh areas develop.
- Zoology: When inundated, Lake Reeve attracts up to 12,000 migratory waders and is one of the five most important areas for waders in Victoria. The total concentration of waders at the south-western end of Lake Reeve fluctuates in response to local conditions of salinity, water depth and human disturbance. The lake has supported the largest concentration (5000) of Red Knot (*Calidris canutus*) recorded in Victoria, as well as up to 3000 Sharp-tailed Sandpiper (*Calidris acuminata*) and up to 1800 Curlew Sandpiper (*Calidris ferruginea*).

Ninety Mile Beach Marine National Park

The Ninety Mile Beach Marine National Park (MNP) is the only marine park in the vicinity of the project. It is located 23 km southwest of the offshore project area.

The Ninety Mile Beach MNP covers an area of 2,750 ha and extends along approximately 5 km of coastline and offshore for 5 km from the high-water mark. The park protects an internationally significant sandy environment, recognised for its exceptionally high diversity of marine invertebrates. The park's key natural values are listed as:

- Very high diversity of marine invertebrates, including the large endemic southern Australian seastar (*Coscinasterias muricata*) and the soft coral *Pseudogorgia godeffroyi*;
- Scattered low calcarenite reefs providing habitat for a distinctive marine invertebrate fauna, especially sponges, with sparse flora communities of small red algae; and
- Important habitat for threatened shorebird species, including species listed under international migratory bird agreements.

The low sub-tidal calcarenite reefs scattered throughout the park support a unique invertebrate biota, including colourful sponge gardens. The long sandy beach (the area between the high water and low water marks are included in the park) provide extensive habitat for shorebirds, including international migratory waders and the threatened hooded plover (*Thinornis rubricollis*).

The sub-tidal reefs support a community dominated by invertebrates, particularly sponges and sea squirts. Seaweeds are largely absent, possibly because of frequent scouring by shifting sand. The reefs themselves are likely to be periodically covered and uncovered by sand.

The waters of the park have aggregations of juvenile white shark (*Carcharodon carcharias*), snapper (*Pagrus auratus*), Australian salmon (*Arripis* spp.), long-finned pike (*Dinolestes lewini*) and short-finned pike (*Sphyaena novaehollandiae*). The southern right whale, Australian fur seals and New Zealand fur-seals are known to frequent the park.

The Ninety Mile Beach is a potentially important area for the endangered hooded plover (listed as vulnerable in Victoria). However, their numbers between McLoughlins Point and Seaspray on biannual counts between 2000 and 2006 declined markedly from 40 to three, with none observed during the 2004 and 2006 survey. The loss of roosting and nesting areas due to beach erosion may be a major factor. The area is also used by other threatened shorebirds, including crested terns, Caspian terns, pied oystercatchers and sanderlings.

9. Land availability and control

Is the proposal on, or partly on, Crown land?

☐ No ☒ Yes If yes, please provide details.

Approximately 25% of land within the Project Extent is Crown Land. There will be a number of Crown land parcels impacted by the construction works, principally Crown land administered by Central Gippsland Regional Water Corporation, Wellington Shire Council, Parks Victoria and DELWP. In addition, there are various road and waterway crossings that will be traversed using trenchless HDD techniques.

In cases where environmental or social values are lower within the Crown Land corridor compared to adjacent private property, the Crown land will be favoured to form the pipeline alignment.

A summary of the Crown Land intersected by the pipeline route is presented in Table 6.

Table 6. Crown Land within the Project Extent and Construction Footprint

			Project Footprint		
Crown Land Manager	**Crown Land Use**	**Project Extent Area (Ha)**	**Approx. length (km)**	**Approx. temporary construction area (ha)**	**Approx. easement area (ha)**
Central Gippsland Region Water Corporation	Utility	808.05	4.14	11.623	8.33
Crown (DELWP) / Wellington Shire Council	Unclaimed Road	59.45	1.14	2.13	0.17
Parks Victoria	Gippsland Lakes	37.46	0.00	0.00	0.00
Wellington Shire Council	Council & Govt Road	35.62	0.09	0.23	0.04
Secretary to the Department of Environment, Land, Water and Planning	National Park & Indigenous Land Use	23.24	0.26	0.76	0.51
VicRoads	Arterial Road	3.67	0.00	0.00	0.00
Wellington Shire Council	Public Land	3.17	0.00	0.00	0.00
Total		**970.66**		**14.75**	**9.05**

Current land tenure (provide plan, if practicable):

The project construction footprint is primarily proposed within freehold land (owned by private persons) with the remaining land tenure similar areas of public land and Crown land (outlined in Table 6 above). A summary of the different land tenure intersected by the pipeline route is presented in Table 7.

Table 7. Current Land Tenure – project construction footprint

Land	Approx. length (km)	Approx. temporary construction area (ha)	Approx. easement area (ha)
Freehold land	8.64	62.69	19.97
Crown land	5.63	14.75	9.05
Public land	4.57	12.94	9.44

The pipeline survey extent has been selected to avoid any areas of Low-Density Residential zoning, favouring areas of Public Use zoned land where possible.

A summary table listing all landholders directly affected by the proposed pipeline routes and those who are within 500m of the project extent is attached for reference, refer **Attachment 06a, 6b, 6c** and **6d.**

Intended land tenure (tenure over or access to project land):

Land tenure will be required for all of the Project components (shore crossing and HDD/direct pipe compound, gas plant and pipeline alignment). The exclusive use of the shore crossing compound (including the HDD crossing and Main Line Valve) and Gas Plant land areas (for each option identified) may be secured through a number of mechanisms (i.e. purchase or leasing) and these options will continue to be explored in land tenure discussions that commenced in late 2018.

GBE proposes to obtain an easement in gross for the construction and operation of the pipeline, which will be registered on the title of freehold land. The easement will afford GBE certain rights in relation to accessing the land for the ongoing and safe operation of the pipeline. GBE will obtain an easement of generally 30m in width where landowners agree to conditions. This is the minimum area necessary to undertake any operations and maintenance activities.

In relation to the proposed pipeline facilities, GBE will as a preferred option, seek to acquire or lease land to allow for the construction and continued access to these above-ground facilities during the operation of the pipeline.

The pipeline easement will include certain restrictions which can be undertaken on the activities within the easement area, including but not limited to preventing the erection of structures or excavation of land below a certain depth, planting of permanent vegetation that may impact the pipeline and line of sight between the pipeline warning markers and altering the existing contour of the land. Other than these restrictions in relation to the safe operation of the pipeline, landowners have the right to use and enjoy the land and GBE will reinstate the land to its former condition following pipeline construction.

Where the pipeline intersects Crown land, or public land and similar tenures, GBE will seek the agreement of the relevant land manager. These agreements will be specific to the authority that manages land (e.g. boundary watercourses, roads) and in addition GBE will seek the relevant Crown Land Ministers consent for any Crown land affected by the pipeline where required.

Land tenure discussions include securing additional access rights (to and from) for access tracks, power supply and water and waste management. Landholder negotiations for the Gas Plant will be undertaken with landowners at each of the potential locations.

Pipeline route - Negotiations with Crown land managers and private landowners to secure tenure for the pipeline alignment in the form of an easement will be required. Prior to granting of a Pipeline Licence, DELWP need to be satisfied that all necessary interests in land have been acquired by agreement with the owner. In the event that agreement cannot be reached, acquisition of the land through the *Land Acquisition and Compensation Act 1986*, can be pursued, but not until six months of negotiation have elapsed.

Other interests in affected land (eg. easements, native title claims):

Native Title

The Gunaikurnai hold native title rights over much of Gippsland, including Crown Land within the project extent. The Traditional Owner Settlement Act 2010 includes provisions for negotiating an out-of-court agreement, Indigenous Land Use Agreement (ILUA) between traditional owners and proponents for activities on Crown land where a traditional owner settlement has been reached. An ILUA may be one option for the use and occupation of crown land with regard to the onshore pipeline and MLV site.

Several third-party easements intersect the proposed pipeline route for the project. These are listed in **Attachment 06d** (Land tenure in the project extent).

10. Required approvals

State and Commonwealth approvals required for project components (if known):

Relevant approvals are listed in Table 8 below. **Attachment 05** provides a table of the geographic relevance of applicable legislation. Permit and licencing arrangements under these Acts above will require evidence of the proponent's assessment of the environmental impacts from the project, continued community engagement and submission and approval of Environment Plans and other planning documents.

Table 8 - Applicable legislative approvals

Legislation	Scope and Relevance to the Activity
Commonwealth Legislation	
Environment Protection and Biodiversity Conservation Act 1999.	The EPBC Act (1999) provides a legal framework to protect and manage nationally and internationally important flora, fauna and ecological communities defined as matters of national environmental significance. This project was referred under this Act in 2003. The project will be self- assessed by the proponent in relation to EPBC referral and Environmental Impact Statement requirements.
Native Title Act 1993.	The Native Title Act recognises the rights and interests of Aboriginal peoples and Torres Strait Islanders to traditional lands and waters. Where native title has been determined, it establishes a framework for negotiation with the native title holder for the use of the land for economic purposes. This project may require consideration under this Act and the related Traditional Owner Settlement Act 2010 for native title determination and indigenous land-use agreement.
Navigation Act 2012.	This Act provides for the regulation of the maritime industry. Vessels (for example, pipe lay vessels, barges) operating in the activity area/project extent will be required to meet the requirements of this Act.
Civil Aviation Act 1988.	This Act establishes the framework for the regulation and administration of civil aviation in Australia, including safety standards and requirements. The Civil Aviation (Buildings Control) Regulations 1988 control the construction of buildings, structures or objects that constitute or may constitute obstructions, hazards or potential hazards to aircraft in the vicinity of an aerodrome. CASA approval to construct a building or structure in the vicinity of an aerodrome.
Victorian Legislation	
Aboriginal Heritage Act 2006.	This Act provides for the protection and management of Victoria's Aboriginal heritage. It establishes a system of management plans and permits which proponents need to comply with when carrying out specified activities that may impact on Aboriginal cultural heritage. The project may require Cultural heritage due diligence assessment and the development of a Cultural Heritage Management Plan.
Catchment and Land Protection Act 1994.	The CaLP Act provides a framework for the regulation and control of pests, weeds and diseases within Victorian catchments.
Climate Change Act 2017	This Act provides a policy framework for the management of climate change risks by establishing objectives and action plans for climate change targets and introduces a system of climate change reporting.
Country Fire Authority Act 1958.	This Act establishes the Country Fire Authority (CFA) as the fire safety regulator in the country area of Victoria. It sets out the powers, duties and responsibilities of the CFA and its officers. It includes prohibitions and provisions for the prevention of fires. This Act provides for the management of fires, and road accident investigation and extrication. The project may require a Fire Danger Period Permit for hot work and/or Total Fire Ban Permit for hot work.
Crown Land (Reserves) Act 1978.	The Crown Land (Reserves) Act 1978 enables reservation of land for public purposes, stipulates how reserved land is to be managed, including the leasing provisions for commercial and non-commercial purposes on reserved Crown land. This Act provides for the reservation of Crown Lands for certain

	purposes and for the management of such reserved lands. This project may require Temporary lease to use reserved Crown land (construction) and Leases for pipeline easements.
Environment Effects Act 1978.	This Act establishes a process for assessing the potential environmental impacts or effects of a proposed development and enables statutory decision-makers (Ministers, local government and statutory authorities) to make decisions about whether a project with potentially significant environmental effects should proceed, based on an Assessment by the Minister for Planning. The EE Act provides a legal framework for the assessment and management of potential impacts to the environment as a result of development projects. A referral may require the development of an Environmental Effects Statement.
Environment Protection Act 1970.	The Environmental Protection Act (1970) provides a legal framework for the systematic and strategic management of potential and realised environmental impacts. This is the key Victorian legislation that controls discharges and emissions (air, water) to the environment within Victoria (including state and territorial waters). Triggered in the event of a marine diesel oil spill and where vessels need to discharge domestic ballast water into State waters. The Acts provide the framework to protect the environment in the State of Victoria. It applies to noise emissions and the air, water and land. They also set out EPA's objectives, powers, duties and functions. The project may require EPA Works Approval and EPA licence to operate a scheduled premise.
Flora and Fauna Guarantee Act 1988.	This Act legislates for the conservation of threatened species and communities and for the management of potentially threatening processes. It includes requirements for: - listing threatened species, communities and threats to native species - an overarching strategy for Victoria's biodiversity - the declaration of habitat critical to the survival of native plants and animals - a duty on public authorities to have regard to the objectives of the Act in their operations - permits for activities that could harm threatened plants and fish and communities. The project may require a Permit to Take Protected Flora/Fauna.
Gas Safety Act 1997.	This Act regulates the safety of gas supply and use in Victoria, providing for the safe conveyance (transmission and distribution), sale, supply, measurement, control and use of gas. It is administered by Energy Safe Victoria. The project may require Safety Cases.
Heritage Act 1995.	The Act identifies and protects heritage places and objects that are of state - level cultural heritage significance to Victoria, including: archaeological sites and artefacts. historic buildings, structures and precincts. This project may require a Heritage Permit to undertake works to a Heritage Place or Object.
Land Act 1958.	This Act deals with sale, grants and occupation of Crown land in Victoria including leases for community, commercial and industrial purposes. Project may require a Temporary lease to use Crown land (construction) and Lease for pipeline easement under this Act.
Land Acquisition and Compensation Act 1986.	This Act establishes the procedure for the acquisition of land for public purposes; and provides for the determination of the compensation payable in respect of land so acquired. The project may require consideration of Compulsory acquisition of land.

Local Government Act 1989.	The Act establishes and regulates the operation of local councils, including provisions for councils' powers to make and enforce local laws. The project may require Traffic Management Plan and permits for works on local roads.
Marine and Coastal Act 2018.	The Marine and Coastal Act (2018) is a piece of legislation that has been implemented to better manage Victorian marine and coastal environments.
National Parks Act 1982	Victoria has 24 marine national parks and sanctuaries that were established and are protected and managed under the National Parks Act 1982 (Vic) by Parks Victoria. There is one marine protected area located in the vicinity of the project area, Ninety Mile Beach Marine National Park (MNP), 22 km southwest of the activity area.
Occupational Health and Safety Act 2004.	This Act is the main workplace health and safety law in Victoria. It sets out key principles, duties and rights about OHS. It protects the health, safety and welfare of employees and other people at work and ensures that the health and safety of the public is not put at risk by work activities. This project may require a Major Hazard Facility licence.
Offshore Petroleum and Greenhouse Gas Storage Act 2010.	Addresses all licensing, health, safety and environmental issues for offshore GHG activities in Victorian coastal waters (between the low water mark and the 3 nm limit). This Act and its Regulations (Chapter 2 – Environment) are similar to the Commonwealth Act and Regulations of the same name. Section 61 of the Act (Principles of sustainable development) states that the administration of the Act should take into account the principles of sustainable development. These principles include involving the community in issues that affect them. To this extent, the stakeholder consultation undertaken for the activity (described in Chapter 4) satisfies this requirement. This project may require: - Production Licence - Licence to construct and operate a pipeline - Consent to operate a pipeline - Environment Plans - Safety cases - Field development plan - Well Operations Management Plan - Pipeline Management Plan - Diving safety management plan and diving project plan.
Pipelines Act 2005.	The Pipelines Act 2005 applies to pipelines for the conveyance of petroleum and any petroleum product, including gas (Sections 7 and 9). A licence is required under the Pipelines Act to construct and operate a pipeline (Part 3). Alteration of a pipeline requires the amendment of the pipeline licence (Division 6). If the alteration will not affect the rights or interests of any other person it is considered minor (Section 66), otherwise it is considered significant (Section 68). Under the Act (Section 5), "pipeline" includes, but is not limited to: - apparatus for inducing or facilitating the flow or movement of anything through the pipe or system of pipes - apparatus or facilities permitting the addition of anything to or removal of anything from the pipe or system of pipes to facilitate flow. Schedule 1 Part 2(c) is an exclusion from the application of the Act for "a pipeline entirely on land the freehold of which is owned or leased by a licensee and which is controlled by that licensee". Pipeline licence/ licence amendment. In addition to a written application for a pipeline licence or a significant licence amendment, the proponent is likely to

	be required to prepare and submit for approval: - a Consultation Plan - a Construction Environment Management Plan - an Operation Environment Management Plan - a Safety Management Plan
Traditional Owner Settlement Act 2010.	This Act provides for an out-of-court settlement of native title, allowing the Victorian Government to recognise traditional owners and certain rights on Crown land. The project may require negotiation of an agreement for access to crown land where traditional ownership has been recognised and the settlement agreement bestows the traditional owner's rights with regard to control of land use.
Water Act 1989.	The Water Act (1989) provides a legal framework for the management of Victoria's water resources. The Water Act provides for the integrated management of surface and groundwater, including the use, conservation and management of water resources and the protection and enhancement of the environmental qualities of waterways and catchments. The project may require a Works on Waterways permit.
Wildlife Act 1975.	This Act establishes procedures to protect and conserve wildlife, allows for the sustainable use of and access to wildlife; and regulates the conduct of persons engaged in wildlife related activities. This project may require management authorization for fauna handling.

Have any applications for approval been lodged?

☐ No ☒ Yes If yes, please provide details.

The project was referred under the EPBC Act in 2003 and the referred project was determined to be 'not a controlled action'. It is the intent of GB Energy to self-assess any material changes in the proposed action and to undertake seasonal ecology survey in accordance with applicable Federal survey guidelines to ensure that we have knowledge on the presence or absence of MNES within the proposed disturbance corridor.

A pipeline consultation plan was prepared under Part 4; Division 1 of the Pipelines Act, (2005) in January 2019 and is available for reference on the GBE website.

Approval agency consultation (agencies with whom the proposal has been discussed):

Please refer to **Attachment 06a, b, and c** which lists all approval agency consultation undertaken to date.

Other agencies consulted:

Please refer to **Attachment 06a, b, c,** which lists other agencies consulted to date.

PART 2 POTENTIAL ENVIRONMENTAL EFFECTS

11. Potentially significant environmental effects

Overview of potentially significant environmental effects (identify key potential effects and comment on their significance and likelihood, as well as key uncertainties):

An environmental planning risk assessment has been undertaken for both onshore (**Attachment 07**) and offshore activities (**Attachment 08**). As part of the risk assessment, environmental assets/values were identified, sources of risk identified, and potential project impacts were articulated, including ancillary and facilitated works. The risk assessment matrices and definitions applied are provided in **Attachment 12.**

The preliminary environmental risk assessment identified that the Project has the potential to impact the following assets:

- Cultural heritage;
- Non-Aboriginal cultural heritage;
- Native vegetation;
- Threatened flora and fauna species;
- Waterways and water environments;
- Marine habitats (e.g., nearshore rocky reef);
- Landscapes and soils; and
- Social/amenity environments (including commercial/marine fisheries).

With control measures proposed in the risk assessments (**Attachment 07** and **Attachment 08**) the residual risks of potential impacts are summarised in Table 9.

Table 9 – Indicative preliminary environmental impact and risk summary

ONSHORE		Residual Risk
1	Disturbance/harm to known and unknown sites of cultural heritage	Low
2	Disturbance/harm to known and unknown non-Aboriginal cultural heritage sites	Low
3	Native vegetation removal	Low
4	Disturbance to threatened flora and fauna species and communities	Low
5	Disturbance or discharge to waterways and water environments	Low
6	Disturbance to high value/sensitive landscapes and soils	Low
7	Disturbance to social amenity (air, noise, light, traffic, vibration)	Low
OFFSHORE		
Known hazards (known impacts)		Residual Consequence
8	Generation of underwater sound – impacts to biological receptors	Minor
9	Underwater sound – potential disruption to commercial fisheries	Minor
10	Seabed disturbance	Minor
11	Atmospheric emissions	Minor
12	Light emissions	Minor
13	Discharge of sewage and grey water	Minor
14	Discharge of cooling and brine water	Minor
15	Discharge of putrescible waste	Minor
16	Discharge of deck and bilge water	Minor
Potential hazards (unplanned/accidental)		Residual Risk
17	Accidental overboard release of hazardous and non-hazardous waste	Low
18	Introduction of invasive marine species	Medium
19	Displacement or interference with third party vessels	Low
20	Underwater sound interaction with swimmers and divers	Low
21	Vessel strike/entanglement with megafauna	Low
22	Diesel spill	Low
Hydrocarbon spill response activities		Low

Key to definitions from risk methodologies – Risk treatment.		
	Low	The risk is tolerable and can be managed by routine processes and regular review.
	Minor	Localised temporary effect. Little or no effect or small number of plants or animals or habitat. No threatened species are affected. No visible damage to items/places of local, state, national or international cultural heritage significance.
	Medium	The risk is tolerable. Management plan for the threat to prevent occurrence. Monitor to determine if risk changes.

**Table Notes:*

- *Attachment 07 and Attachment 08 present the full inherent and residual risk scores and the control measures to be applied for this project.*
- *A full risk assessment ENVID workshop will be conducted to inform this project and approvals processes.*
- *The risk matrices for the preliminary risk assessments are presented in Attachment 12.*

The key sources of potential impacts were identified as:

- Disturbance caused by the construction process, specifically:
  - Soil movement and replacement;
  - Vehicle and machinery movement (noise and air emissions);
  - Formation of temporary site access;
  - Laydown and vehicular turnaround preparation;
  - Installation of pipeline, valves and meters; and
  - Construction of the gas plant.
- Disturbance caused by the operational activities:
  - Vegetation maintenance activities
  - Operational vehicle movements
  - Soil disturbance due to pipeline maintenance activities
  - De-watering of the trench and excavators
  - Noise emissions from operation activities and traffic movements
- Disturbance caused by the decommissioning process:
  - Soil movement and replacement;
  - Vehicle and machinery movement (noise and air emissions);
  - Formation of temporary site access;
  - Laydown and vehicular turnaround preparation;
  - Installation of pipeline, valves and meters;
  - Water management (onshore and offshore emissions)
  - Waste management (onshore and offshore emissions)

The key potential impacts that construction and operation of the Project may have on the wider environment were identified during the preliminary risk assessment as:

Onshore / Terrestrial Environment

Vegetation, Flora, Fauna

- Assessment of field survey data for the preferred alignment shows the proposed native vegetation removal is not of state or regional significance, with impacts below regulatory triggers in relation to endangered EVCs or very high conservation significance vegetation.
- Activities associated with construction have the potential to damage or destroy protected habitat, listed species or threatened/ endangered vegetative communities.

As noted in section 12, there are listed species and communities within 5km of the project area. Known species identified through past studies and desktop searches have been identified and targeted surveys scheduled.

Waterways

- Uncontrolled ground disturbance activities impact listed aquatic species and habitat.
- Ineffective site-based controls lead to sedimentation of waterway and transport of silt/soil off site.
- Ineffective reinstatement leads to long term impact on waterway crossing location.
- Ineffective scheduling leads to water flow in ephemeral waterways prior to reinstatement of work.
- Disturbance of acid sulphate soils leading to poor water quality, impacts on fish species and social amenity values.
- HDD - uncontrolled discharge of drilling fluids.

As noted in Section 13, water management is to be considered in further detail, particularly in relation to Ramsar wetland values at Lake Reeve and in relation to the marine offshore environment.

Landscape and soils

- Short-term disturbance to high value/sensitive landscapes during construction phase.
- Intermediate disturbance to high value sites caused by vegetation removal.
- Permanent alteration of landscape features through disturbance during construction (i.e. benching through rock areas).
- Permanent introduction of new above ground infrastructure (gas plant, valves, signage markers) impact surrounding landscape.
- Erosion/ mixing of topsoil and subsoils; sedimentation of waterway; sub-standard reinstatement/rehabilitation in problem soil areas.

As noted in Section 14, coastal acid sulphate soils are present in the region, and some clearing will be required during construction along the pipeline corridor.

Social environments

- Short-term impact on local roads, road users and adjacent landholders/ residents from traffic during construction.
- Short-term dust, mud, noise, odour causes off-site impact and complaint.
- Change in land use through construction of above ground infrastructure.
- Inadvertent weed transfer caused by construction vehicles, machinery and personnel movement between properties.
- Disturbance to known and unknown sites of Aboriginal and non-Aboriginal significance.
- Potential harm to cultural heritage artefacts and landmarks.

As noted in Section 15, construction traffic for the gas plant and pipeline will be temporary and minor with studies to be conducted and impacts assessed associated with amenity impacts (air, noise, dust, vibration) on the local community. Community consultation has commenced in accordance with a consultation plan with potentially affected stakeholders.

Energy, Waste and Greenhouse Gas

- The facility will be connected to the grid with gas fired power generation back up.
- Gas will be used to operate compressors.

Facilitated activities

- Disturbance of threatened species, communities, native vegetation, areas of cultural significance and other areas of sensitivity.

Offshore Marine Environment

Habitat damage

- Drilling will result in the discharge of drill cuttings, muds and cement to the ocean, which may result in smothering of nearby seabed habitats (e.g., sponge gardens, reef). Modelling will be conducted to quantity potential impacts.
- Pipe lay may result in the damage to or loss of a small section of low-profile nearshore reef habitat (and associated species) if it cannot be avoided through pipeline realignment or re-design. The exact locations of sensitive seabed habitats will be known once surveyed. Indications are that most of the pipeline corridor comprises sandy sediments.
- A diesel spill during drilling, pipe lay or support vessel activities (e.g., from collision with another vessel, diesel tank failure or grounding) will result in diesel washing ashore and sub-lethal or lethal effects to intertidal fauna and shorebirds.

Disturbance to marine fauna

- Generation of underwater sound and vibrations from the drill rig, support vessels and pipe lay barge may lead to temporary and localised behavioural disturbance to sound-sensitive marine fauna, such as migrating whales.
- The presence of the drill rig, support vessels and pipe lay barge may lead to collisions and therefore injury or death) with individual animals, such as whales, dolphins or seals.
- A diesel spill during drilling, pipe lay or support vessel activities (e.g., from collision with another vessel, diesel tank failure or grounding) may result in sub-lethal or lethal effects to pelagic fauna (e.g., whales, dolphins, seals and fish).
- The hulls of or ballast water discharges from the drill rig, support vessels and pipe lay barge may result in the introduction (and colonisation and spread) of invasive marine pests.

Reduced water quality

- During drilling and pipelay, routine discharges including cooling water, treated sewage and deck drainage from the drill rig, pipe lay barge and support vessels will result in very localised mixing zones where surface water quality will be temporarily reduced.
- Drilling will result in the discharge of drill cuttings, muds and cement to the ocean, which will result in temporary and localised turbid plumes. Modelling will be conducted to quantity potential impacts.
- General waste, food waste and oily bilge waters from the drill rig, pipe lay barge and support vessels will be returned to shore and not discharged overboard into State waters.
- Accidental overboard discharges of waste could result in pollution.
- A diesel spill during drilling, pipe lay or support vessel activities (e.g., from collision with another vessel, diesel tank failure or grounding) will result in a temporary reduction in water quality until such time as the diesel completely weathers (several days to weeks).

Reduced air quality

- Combustion of fuel (marine diesel oil) from the drill rig, support vessels and pipe lay barge will lead to particulate emissions to air and a temporary and very localised reduction in air quality.
- No air emissions resulting from routine subsea well operations other than those generated by vessels undertaking routine subsea maintenance.

Disruption to socio-economic environment

- Small safety exclusion zones around the drill rig during drilling, and around the pipe lay barge during pipe lay will exclude commercial fishers from areas in which they may be licensed to operate. This may result in reduced catches.
- Lighting from the drill rig, support vessels and pipe lay barge, when close to shore, will result in temporary and localised light glow and a possible disturbance to the remote nature of the coastline.
- During well operations, a permanent 500-m radius petroleum safety zones (PSZ) will be gazetted around the subsea wells, meaning fishing operations cannot take placed within the PSZs. This may result in reduced catches for the life of well operations.
- Generation of underwater sound and vibrations from the drill rig, support vessels and pipe lay barge may lead to temporary and localised interruptions to nearshore marine recreational activities (e.g., swimming, diving, beach fishing, etc).

Key uncertainties

As the project moves through the completion of the FEED and Detailed Design engineering processes any uncertainty associated with potential impacts will be addressed and mitigated.

The absence of a detailed design and finalised footprint for the Project does not prevent the development of preventative and proactive measures that will condition the design to be considerate of environmental and cultural assets.

12. Native vegetation, flora and fauna

Native vegetation

Is any native vegetation likely to be cleared or otherwise affected by the project?

☐ NYD ☐ No ☒ Yes If yes, answer the following questions and attach details.

What investigation of native vegetation in the project area has been done? (briefly describe)

A number of environmental assessments were undertaken by Cape Energy between 2006-2008:

- Golden Beach Environment Report – GPF and Onshore Pipelines [VIC/RL1 (V)] (Cape Energy Victoria Pty Ltd 2008).
- Golden Beach Gas Project, Flora and Fauna Assessment (Brett Lane & Associates 2006)
- Golden Beach Gas Project, Wellsite Flora and Fauna Assessment (Brett Lane & Associates 2006)

These provided background information and informed the scope of new studies commissioned by GBE. The project team has completed a Vegetation Quality (habitat hectare) assessment of native vegetation within

the project footprint, including the condition, extent, EVC and bioregional conservation status. The EVC data collected is presented as a map series in **Attachment 09.**

What is the maximum area of native vegetation that may need to be cleared?

☒ NYD Estimated area *Please refer to tables below*

This estimate is based on the preferred pipeline route (2c) and the GP site option 1 (Please refer to Table 12 and below). GP site option 1 was used as it has the greater extent of native vegetation of the two options being considered, having 6.38 Ha of low value Burgan/Kunzea regrowth.

Of the native vegetation to be cleared, only 0.89 Ha is of an endangered EVC and 6.9 Ha of very high conservation significance, as referenced in the Ministerial guidelines for assessment of environmental Effects (DSE 2006).

Table 10. Potential clearance of vegetation that is endangered or of Very High Conservation Significance

	Very High Conservation Significance	Extent of clearance (Ha)
1	Total Endangered EVC	0.89
2	Very High Conservation Significance Endangered with a habitat score 0.4 - 1	0.38
	Vulnerable with a habitat score 0.5 - 1	5.82
	Rare with a habitat score 0.6 - 1	0.00
	RAMSAR (not otherwise included)	0.71
	Total very high conservation value	6.90

As project planning progresses, further options for avoiding and minimising vegetation losses will be identified to ensure minimal impact to native vegetation.

The locations of ancillary works, such as installation of Cathodic Protection bed(s) and site access/ egress, have not yet been confirmed. Where practicable, these will be located to avoid areas of native vegetation. Where any additional small areas of native vegetation removal are required, these areas will be assessed in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017) and included in calculations for offset requirements.

Which Ecological Vegetation Classes may be affected? (if not authorised as above)

☒ NYD ☒ ~~Preliminary~~/detailed assessment completed. If assessed, please list.

A field survey of Ecological Vegetation Classes (EVC) has been undertaken for the preferred pipeline alignment. This survey informed the basis assessment of potential vegetation impacts. The results of this assessment are presented in **Error! Reference source not found.** and **Error! Reference source not found.**.

The assessment was been based on a preliminary construction corridor for the pipeline up to 30m wide and a 350m x 350m site clearance requirement for each Gas Plant option. This represents 'worst case' for the Gas Plant sizing.

The locations of ancillary works, such as installation of Cathodic Protection bed(s) and site access/ egress, have not yet been confirmed. Where practicable, these will be located to avoid areas of native vegetation. Where any additional small areas of native vegetation removal are required, these areas will be assessed in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation* (DELWP 2017) and included in calculations for offset requirements.

Table 11. EVC mapping intersecting the Gas Plant Site Options

EVC Name	GP Option 1 (Ha)	*GP Option 2 (Ha)#*	*GP Option 3 (Ha)#*	GP Option 4 (Ha)
3 Damp Sands Herb-rich Woodland (Vulnerable)	-	*7.98*	*10.88*	-
48 Heathy Woodland (Least Concern)	-	*3.74*	*0*	-
16 Lowland Forest (Vulnerable)	6.38*	*0.00*	*0.00*	0.49
Total mapped EVC Area (Ha)	**6.38**	*11.7*	*10.9*	**0.49**

the Modelled 2005 Ecological Vegetation Classes (with Bioregional Conservation Status)
https://www.data.vic.gov.au/data/dataset/native-vegetation-modelled-2005-ecological-vegetation-classes-with-bioregional-conservation-status
*recent regrowth

Table 12. EVC mapping intersecting with Pipeline Options

EVC Type	*Pipeline Option 2a (Ha)#*	*Pipeline Option 2b (Ha)#*	Preferred Pipeline Option 2c (Ha)
2 Coast Banksia Woodland (Vulnerable)	*0.60*	*0.60*	2.10
3 Damp Sands Herb-rich Woodland (Vulnerable)	*19.07*	*12.38*	0.26
9 Coastal Saltmarsh (Least Concern)	*0.70*	*0.70*	1.39
10 Estuarine Wetland (Least Concern)	*0.26*	*0.26*	0.71
16 Lowland Forest (Vulnerable)	*0.10*	*0.10*	4.42
48 Heathy Woodland (Least Concern)	*6.49*	*12.53*	4.97
53 Swamp Scrub (Endangered)	-	-	0.18
160 Coastal Dune Scrub (Depleted)	-	-	0.08
992 Water Body - Fresh	*1.12*	*1.12*	-
Total Mapped EVC area (Ha) (assumes a 30m wide pipeline disturbance corridor)	*28.34*	*27.69*	**14.12**

the Modelled 2005 Ecological Vegetation Classes (with Bioregional Conservation Status)
https://www.data.vic.gov.au/data/dataset/native-vegetation-modelled-2005-ecological-vegetation-classes-with-bioregional-conservation-status

Have potential vegetation offsets been identified as yet?

☒ NYD ☒ Yes If yes, please briefly describe.

A Biodiversity Impact and Offset Requirements (BIOR) report will be completed following the ecology assessment which comprises a targeted survey program.

Other information/comments? (e.g. accuracy of information)

None

NYD = not yet determined

Flora and fauna

What investigations of flora and fauna in the project area have been done?
(provide overview here and attach details of method and results of any surveys for the project & describe their accuracy)

The following investigations of flora and fauna in the project area have been completed and the results of these investigations are discussed in more detail below:

- Marine Habitat Assessment (CarbonNet April 2017)
- Two-staged ecological assessment of gas pipeline alignment options for Project (Practical Ecology Pty Ltd - Stage 1 - June 2019 (**Attachment 09**)
- Pipeline Options Analysis
- Detailed Field Assessments (ongoing)
- Targeted Surveys (Scheduled for Spring 2019/Summer 2019)
- Desktop and Literature Review on likely flora/fauna species and ecological communities in study area
- Searches using the Protected Matters Search Tool (PMST) on for Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act) Matters of National Environmental Significance.

Offshore Studies

A marine habitat assessment was commissioned by CarbonNet for their Pelican 3D marine seismic survey (MSS) and conducted in early April 2017 to characterise the seabed. This habitat assessment included GB Energy's activity area (CarbonNet, 2018). Of the 71 sites sampled in the Pelican MSS area, two sites occur within the project area. These sites, and those surrounding them, indicate that the seabed is dominated by soft sediments (sand).

Onshore Studies

Practical Ecology Pty Ltd was commissioned to undertake a two-staged ecological assessment of gas pipeline alignment options for the Golden Beach Gas Project (**Attachment 09**) comprising a pipeline options analysis (completed) and further detailed surveys in spring and summer 2019/2020.

The Pipeline Options Analysis comprised a desktop and literature review of existing information, preliminary site reconnaissance; and preliminary targeted fauna surveys. The site reconnaissance was undertaken predominantly to assess fauna habitat and to commence targeted fauna surveys based on modelled database information.

Detailed field assessments are currently underway (fauna habitat assessment, targeted fauna survey, flora and native vegetation field assessments) and scheduled for Spring 2019 to Summer 2019 (bird surveys, orchids, reptiles).

A desktop and literature review was undertaken to review information relevant to the study area and likely flora and fauna species, ecological communities and any other relevant ecological values or issues pertaining to these areas. The results are as follows:

- Eight Ecological Vegetation Classes are listed as occurring or have a high likelihood of occurring within the study area (**Attachment 09**, p20).

- One Flora and Fauna Guarantee Act 1988 (FFG Act) listed community also has the potential to occur in the study area – Coastal Moonah Woodland (**Attachment 9**, p20).

A search was conducted for Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act) Matters of National Environmental Significance using the Department of Environment and Energy Protected Matters Search Tool, which identified the following within 5km of the study area:

- One Wetland of International Importance – Lake Reeve in Gippsland Lakes

- Three listed threatened ecological communities – Gippsland Red Gum Grassy Woodland and Associated Native Grassland (Critically Endangered); Natural Damp Grassland of the Victorian Coastal Plains (Critically Endangered); and Subtropical and Temperate Coastal Saltmarsh (Vulnerable).

- Fauna - 63 listed threatened species, 45 listed migratory species, and 80 listed marine species were predicated to occur within that area (**Attachment 09**, p21, App 2, 3).

Preliminary targeted survey outcomes

Preliminary targeted surveys have been undertaken for threatened shorebirds, Southern Toadlets (Appendix 5 of **Attachment 09**, p09) and Dwarf Galaxias (**Attachment 09**, p24). These surveys found no waters which currently support populations, and two wetlands that are currently dry which have characteristics to suit the species that can be managed during construction work applying standard erosion control measures).

Have any threatened or migratory species or listed communities been recorded from the local area?

☒ NYD ☒ No ☒ Yes If yes, please:

- List species/communities recorded in recent surveys and/or past observations.
- Indicate which of these have been recorded from the project site or nearby.

Searches of the VBA and the PMST were conducted to identify threatened species, migratory species and listed communities in the local area.

- Listed ecological communities - Gippsland Red Gum Grassy Woodland and Associated Native Grassland (Critically Endangered); Natural Damp Grassland of the Victorian Coastal Plains (Critically Endangered); and Subtropical and Temperate Coastal Saltmarsh (Vulnerable).

- Listed flora species - 24 species were revealed within 5km of the project area. These species have been recorded or are likely to occur in the study area:

    - Orchids: Maroon Leek-orchid Prasophyllum frenchii, Metallic Sun-orchid Thelymitra epipactoides and the Shy Sun-Orchid Thelymitra planicola
    - Dwarf Kerrawang - Commersonia prostrata
    - Trailing Hop-bush - Dodonaea procumbens
    - Wellington Mintbush - Prostanthera galbraithiae
    - Variable Bossiaea - Bossiaea heterophylla
    - Pink Zieria - Zieria veronicea subsp. veronicea
    - Blue Mat-rush - Lomandra glauca s.s.
    - Gippsland Lakes Peppermint, Eucalyptus arenicola
    - Promontory Peppermint, Eucalyptus willisii s.s.
    - Ribbed Thryptomene - Thryptomene micrantha

- Listed fauna species - A total of 72 state or nationally significant fauna species are recorded in the PMST and VBA within a 5-kilometre radius of the study area. The following species were identified during the desktop review as having a moderate-high likelihood of occurrence within the study area:

    - Green and Golden Bell Frog *Litoria aurea*
    - Growling Grass Frog *Litoria raniformis*
    - Martin's Toadlet *Uperoleia martini*
    - New Holland Mouse (NHM) *Pseudomys novaehollandiae*
    - Eastern Pygmy Possum (EPP) *Cercartetus nanus*
    - Southern Brown Bandicoot (SBB) *Isoodon obesulus obesulus*
    - Swamp Skink *Lissolepis coventryi*
    - Glossy Grass Skink *Pseudemoia rawlinsoni*
    - Lace Monitor *Varanus varius*
    - Shorebirds (e.g. Hooded Plover *Thinornis cucullatus*, Curlew Sandpiper *Calidris ferruginea*, Eastern Curlew *Numenius madagascariensis*)
    - Waterbirds (e.g. Freckled Duck *Stictonetta naevosa*, Blue-billed Duck *Oxyura australis*)
    - Australasian Bittern *Botaurus poiciloptilus*

Targeted surveys for these species are due to be undertaken during Spring/Summer surveys.

The fauna assessment undertaken by BL&A (2006a) identified potential habitat for the Orange-bellied Parrot *Neophema chrysogaster* within the salt marshes at the eastern extent of the project area. Given the lack of records within the study area and the current status of the species (Critically Endangered), with less than

50 individuals thought to exist in the wild, it is considered unlikely to occur within the study area (Practical Ecology, 2019).

If known, what threatening processes affecting these species or communities may be exacerbated by the project? (e.g. loss or fragmentation of habitats) Please describe briefly.

Initial review of key threatening process listed under the *Flora and Fauna Guarantee Act, 1988* (as at December 2016) has identified several threatening processes that have the potential to be exacerbated by the project (Table 13). Each threatening process has been considered in preparing the Onshore Environmental Risk Analysis (**Attachment 07**).

Table 13. Potentially Threatening Processes Assessment

Potentially Threatening Processes	Relevance to the proposed Project impact
Alteration to the natural flow regimes of rivers and streams.	Pipeline corridor contains several minor drainage lines and unnamed watercourses
Degradation of native riparian vegetation along Victorian Rivers and Streams.	Pipeline corridor contains several minor drainage lines and unnamed watercourses. Lake Reeve crossing section has the potential to contain riparian vegetation
Habitat fragmentation as a threatening process for fauna in Victoria.	Pipeline corridor represents a lineal disturbance corridor and may dissect fauna transit corridors
Increase in sediment input into Victorian rivers and streams due to human activities.	Pipeline corridor contains several minor drainage lines and unnamed watercourses. Lake Reeve crossing section has the potential to introduce additional sediment into the lake system
Input of petroleum and related products into Victorian marine and estuarine environments.	Offshore pipelay and well development has the potential to introduce petroleum into the Victorian Marine environment.
Invasion of native vegetation by 'environmental weeds'.	Construction and operation of the pipeline and Gas Plant has the potential to introduce environmental weeds into the project extent via the following means: ▪ Disturbance of the soil profile by machinery and equipment encouraging the germination of dormant weed seeds beneath the ground surface, creating the opportunity for pioneer weed species to establish. ▪ Importation of weed seed contained within material on vehicles, machinery, equipment and personal clothing/ boots ▪ Intra-project transfer of weed seed due to unknown weed location(s) and binding soil conditions ▪ Importation of weed seed in fill material
Prevention of passage of aquatic biota as a result of the presence of instream structures.	Pipeline corridor contains several minor drainage lines and unnamed watercourses
The discharge of human-generated marine debris into Victorian marine or estuarine waters.	Offshore pipelay and well development has the potential to introduce marine debris into the Victorian Marine environment.

The spread of *Phytophtohora cinnamomi* from infected sites into parks and reserves, including roadsides, under the control of a state or local government authority	Construction and operation of the pipeline and Gas Plant has the potential to introduce cinnamon fungus into the project extent via the following means: ▪ Importation of the fungus within material on vehicles, machinery, equipment and personal clothing/ boots ▪ Intra-project transfer of the fungus due to unknown fungus location(s) ▪ Importation of the fungus in fill material
Wetland loss and degradation as a result of change in water regime, dredging, draining, filling and grazing	Lake Reeve crossing section has the potential to contribute to 'wetland loss' through soil disturbance and insufficient reinstatement/ rehabilitation

Are any threatened or migratory species, other species of conservation significance or listed communities potentially affected by the project?

☐ NYD ☐ No ☒ Yes If yes, please:

- List these species/communities:
- Indicate which species or communities could be subject to a major or extensive impact (including the loss of a genetically important population of a species listed or nominated for listing) Comment on likelihood of effects and associated uncertainties, if practicable.

An environmental planning risk assessment has been undertaken for both onshore (**Attachment 07**) and offshore activities (**Attachment 08**). As part of the risk assessment, environmental assets/values were identified, sources of risk identified, potential project impacts were articulated and control measures identified to mitigate risks.

Attachment 11 provides habitat requirements and likelihood of occurrence for listed species identified prior to field surveys commencing.

No threatened or migratory species, species of conservation significance or listed communities identified throughout this project will be subject to major or extensive impact. The potential impacts of the planned offshore and onshore activities were assessed as minor consequence with low residual risk due to the temporary and localised nature and scale of the potential impacts. The activity will be designed and conducted in accordance with management commitments that require compliance with legislation, regulations, Australian Standards, and Construction and Operational Environmental Management Plans that set out measures to avoid impacts to listed native flora and fauna species and communities.

The methodology for the risk assessments is provided in **Attachment 12**.

Is mitigation of potential effects on indigenous flora and fauna proposed?

☐ NYD ☐ No ☒ Yes If yes, please briefly describe.

GBE considers that it can take steps to mitigate the potential effects on indigenous flora and fauna by applying a hierarchy of control as follows:

1. Eliminate the risk by:
    a. Conducting field surveys of the proposed pipeline alignments and Gas Plant locations to identify areas of sensitivity and verify presence or absence of environmental assets.
    b. Avoiding an identified environmental asset by re-design
    c. Changing the proposed construction methodology by selecting a non-impact method (.e.g trenchless solution for shore crossing)
    d. Re-scheduling planned works to avoid the risk (i.e. plan works to avoid seasonal risks – breeding season, fish habitat in ephemeral waterway, etc.)
2. Substitute the risk:

    Adopting a less intrusive construction methodology (i.e. use a 'poor boy' crew that can work slowly through a narrower construction width over discrete lengths of pipeline; use of horizontal directional drilling, for shore crossing.)

3. Isolate the risk:
    a. Preparing planning controls to protect identified environmental assets from construction impacts
    b. Installing physical barriers and separation to shield active construction work from adjacent sensitive receptors.
4. Use engineering controls:

    Modifying detailed design to reduce impact (e.g. micro-siting corrosion prevention beds etc. to avoid environmental assets)

5. Use administrative controls:
    a. Preparing a Construction Environmental Management Plan with specific commitments regarding environmental protection, monitoring and performance.
    b. Ensuring regular formalised communication during construction of identified assets and protective measures required to avoid or reduce impacts.

Other information/comments? (e.g. accuracy of information)

None

13. Water environments

Will the project require significant volumes of fresh water (eg. > 1 Gl/yr)?

☐ NYD ☒ No ☐ Yes If yes, indicate approximate volume and likely source.

Construction water is expected to be purchased from the Gippsland Water Dutson Downs treatment facility with any effluent returned to Gippsland Water for treatment. A detailed water usage will be calculated as detailed design progresses however it is anticipated that expected volumes will be less than 1GL/ yr.

Hydrotest water in the estimated amounts of 8ML of water for a 20km section of pipeline will be required to hydrotest the pipeline. Approximately 90% will be returned to the Dutson Downs water treatment facility as wastewater.

These volumes are not anticipated to contribute significantly to water resource issues.

Operational water requirements will be minimal and will also be confirmed during detailed design for the life of the project. There are no particular operational water requirements for the project apart from the provision of domestic potable water and washdown of plant, vehicles, machinery and equipment as required.

Will the project discharge waste water or runoff to water environments?

☐ NYD ☐ No ☒ Yes If yes, specify types of discharges and which environments.

Water runoff from site will be managed during construction via an Erosion and Sediment Control Plan developed in accordance with EPA Publication 275: Construction Techniques for Sediment Control and the IECA Best Practice Guideline.

Water for the hydrostatic testing will be disposed of following completion of testing in accordance with relevant regulatory requirements and approvals.

Wastewater may be returned or taken to Dutson Downs facility for treatment. Any water discharged to land will be tested on-site to ensure relevant water quality parameters are being met prior to discharge.

The location of discharge will be selected in accordance with the CEMP and logged. Release of water will not cause erosion to the landscape or pooling of water.

Water will not be discharged straight into aquatic environments.

As noted in Section 20, water management is subject to further detailed studies for each phase of the project (construction, operations, decommissioning).

Are any waterways, wetlands, estuaries or marine environments likely to be affected?

☒ NYD ☒ No ☒ Yes If yes, specify which water environments, answer the following questions and attach any relevant details.

As the pipeline corridor details are finalised during the detailed design phase of this project, further details regarding potential impacts and risks streamflow's, particularly in relation to Lake Reeve, will be evaluated and control measures identified and implemented.

Refer to **Figure 5** for a map of Wetland areas in relation to the project area and **Figure 11** for a map of the waterways in the vicinity of the project.

Best practice guidelines will be applied to all watercourse crossings – principally the Australian Pipelines and Gas Association Code of Environmental Practice and the IECA best practice guidelines (Appendix P – Land Based Pipeline Construction).

The construction contractor will be expected to prepare a standard crossing methodology for trenched watercourse crossings that will incorporate best practice methodology and be combined with site specific conditions.

Wetlands and Coastal Lagoons

The proposed pipeline route between the gas plant and the shoreline crossing passes through the coastal saltmarsh and associated saltpans/ephemeral wetland of Lake Reeve, part of the Gippsland Lakes Ramsar Site. Refer to **Figure 10**. Site specific risks to wetlands will be further evaluated.

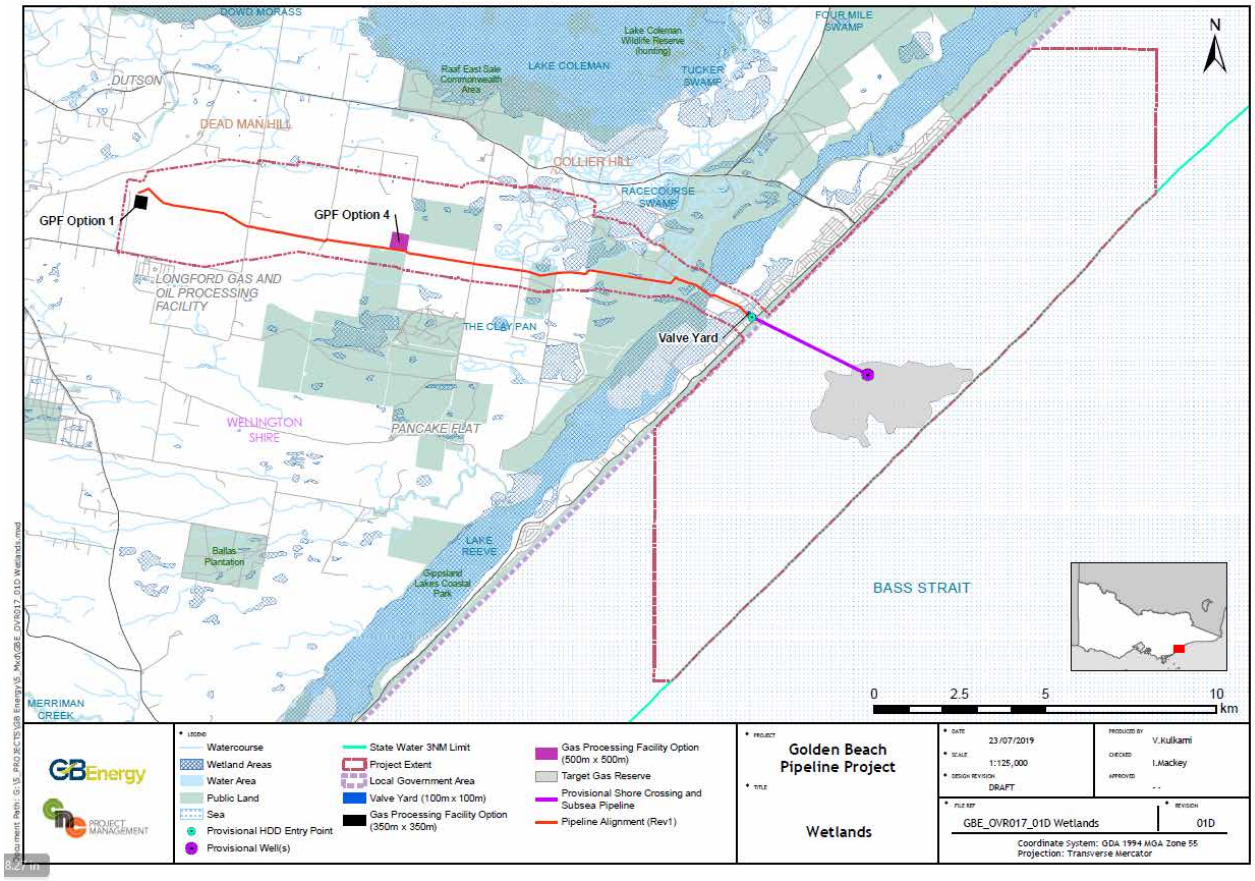

Figure 10 – Wetlands in relation to the project extent

Marine Environment

The proposed activity will potentially have an impact on the marine environment in relation to equipment placement on the seabed, vessel activities, management of planned and unplanned emissions and discharges associated with appraisal drilling, construction and ongoing operations of the offshore facilities. Fisheries in relation to the offshore project extent were described in **Figure 8.**

Are any of these water environments likely to support threatened or migratory species?
☐ NYD ☐ No ☒ Yes If yes, specify which water environments.

Terrestrial Environment

Three fauna species listed on the Advisory List of Threatened Vertebrate Fauna (DSE 2013a) were observed during the desktop ecology assessment conducted for this project. These species were Hardhead *Aythya australis* (listed as Vulnerable), Pacific Gull *Larus pacificus* (listed as Near Threatened) and Emu *Dromaius novaehollandiae* (listed as Near Threatened). It should also be noted, that whilst not listed as a threatened species, the Eastern Long-necked Turtle *Chelodina longicollis* is listed as Data Deficient on the Advisory List (DSE 2013a).

Marine Environment

Marine Fauna
It is estimated that there are over 500 species of fish found in the waters of Bass Strait, including a number of species of importance to commercial and recreational fisheries (LCC, 1993).

There are 34 fish species (28 of which are seahorses and pipefish) recorded in the PMST as potentially occurring in the offshore project area. Two species are freshwater (and therefore unlikely to occur in the project area), while the remaining four species are all migratory (shortfin mako shark, porbeagle shark, great white shark and whale shark), with the latter two species listed as vulnerable under the EPBC Act (none of the fish species are listed as threatened under the FFG Act).

There are 14 cetacean species (8 whales and 6 dolphins) recorded in the EPBC Act PMST as potentially occurring in the offshore project area. The blue whale (*Balaenoptera musculus*), southern right whale (*Eubalaena australis*) and humpback whale (*Megaptera novaeangliae*) are listed as threatened under the EPBC Act and FFG Act, while the sei whale (*B. borealis*) and fin whale (*B. physalus*) are listed only under the EPBC Act. These whale species are only likely to be present in the Project area while migrating through at various times of the year.

The Australian fur-seal (*Arctocephalus pusillus*) and New Zealand fur-seal (*A. forsteri*) are known to occur in the offshore project area and are not listed as threatened under the EPBC Act or FFG Act. There are no haul-out or breeding sites for these sites in or in the near vicinity of the project area.

There are three turtle species recorded in the EPBC Act PMST as potentially occurring in the offshore project area. These species are unlikely to occur in the area other than as vagrants, given the absence of turtle nesting beaches and biological important areas for turtles in Bass Strait. The VBA does not include any recordings of turtles within the project area.

Marine Avifauna
There are 70 bird species recorded in the EPBC Act PMST as potentially occurring in the offshore project area and along the shoreline.

Of the true seabirds, there are 18 albatross species (all listed as threatened under the EPBC Act, some are listed as threatened under the FFG Act, and there is no breeding around mainland Australia), five petrel species (similarly all listed as threatened under the EPBC Act, with the southern and northern giant petrel listed as threatened under the FFG Act), and five other species. There are 42 true shorebirds, including egrets, knots, plovers, godwits and terns, many of which are threatened under both the EPBC Act and FFG Act.

Are any potentially affected wetlands listed under the Ramsar Convention or in 'A Directory of Important Wetlands in Australia'?
☐ NYD ☐ No ☒ Yes If yes, please specify.

The project area occurs within the coastal saltmarsh and associated saltpans/ephemeral wetlands of the listed Gippsland Lakes Ramsar Site for a section of the proposed pipelines that crosses Lake Reeve. This Project and the proposed pipeline route through this area have been referred previously under the EPBC Act. The project is deemed not a controlled action subject to ensuring that any pipeline trenching activities do not occur when Lake Reeve is inundated. This control measure will continue to be applied in this project.

Could the project affect streamflows?

☒ NYD ☒ No ☒ Yes If yes, briefly describe implications for streamflows.

The pipeline corridor intersects four watercourses – two channel drains, one connector stream and a watercourse. None are named. Refer to **Figure 11**.

Best practice guidelines will be applied to all watercourse crossings – principally the Australian Pipelines and Gas Association Code of Environmental Practice and the IECA best practice guidelines (Appendix P – Land Based Pipeline Construction).

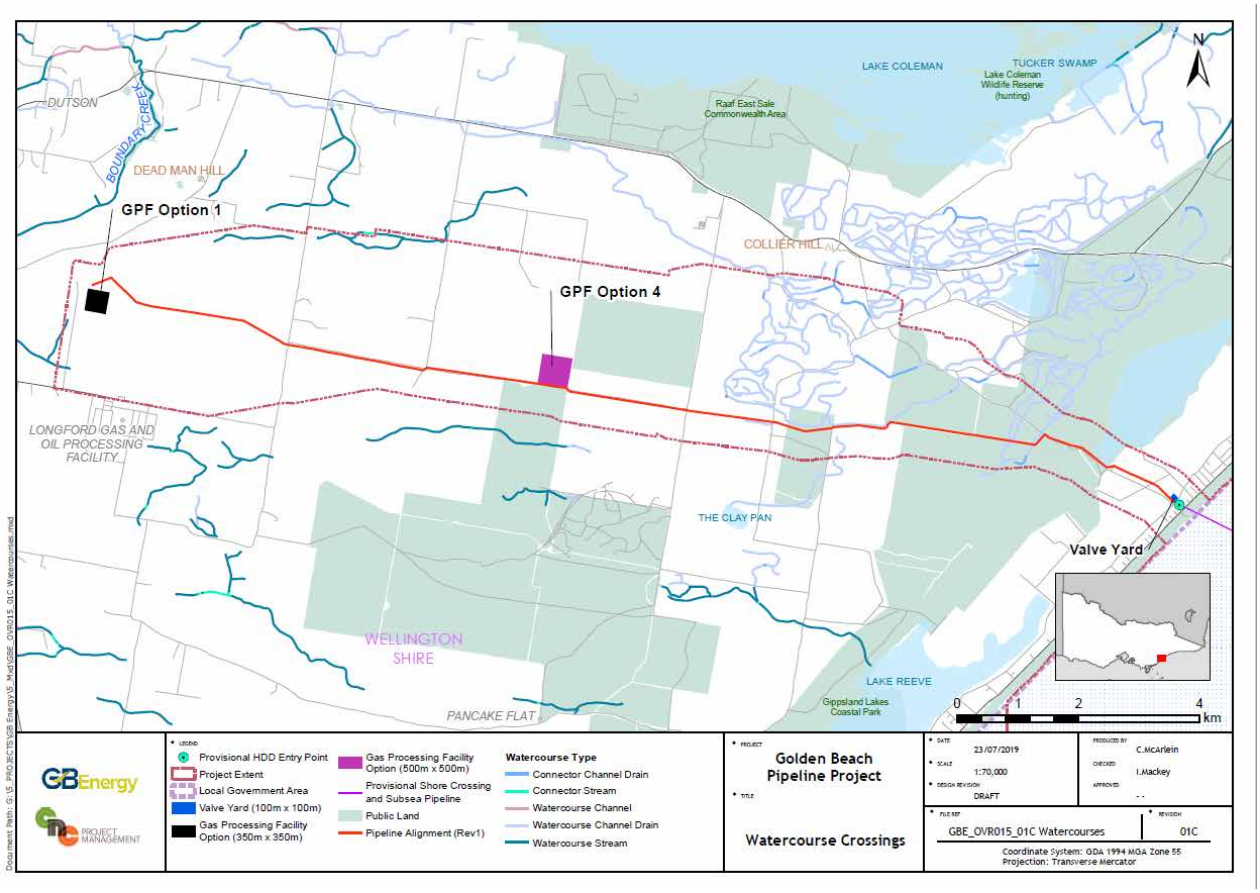

Figure 11 – Water courses in relation to the project corridor

Could regional groundwater resources be affected by the project?

☒ NYD ☒ No ☒ Yes If yes, describe in what way.

The Golden Beach gas reserve is located in the Upper Latrobe formation of the Gippsland Basin and within the 3nm limit of the Victorian coast. The gas accumulation is about 5km long by 2.5km wide and 40m deep and is located between 630m and 650m below the seabed. It is sealed beneath a layer over 200m thick of impermeable calcareous claystones and marls which are in turn overlain by 200m to 250m of interbedded marls and limestones. These layers provide an effective and regionally extensive seal to the Gippsland Basin hydrocarbon accumulations.

There has been a long history of extraction of water and hydrocarbons from the Gippsland Basin as a result of coal mine dewatering, oil and gas extraction, farming and industrial purposes. This extraction has been linked to the known and measured impact of falling groundwater levels in the region and has also lead to concerns that the falling groundwater levels may cause coastal subsidence in areas underlain by compressible strata at some future time. Cape Energy undertook an assessment of the placement and relative size of the Golden Beach gas reservoir in the contact of regional geology and hydrogeology; and an

analysis of the voidage and risk assessment of the impacts associated with extraction arising from the production of gas from the Golden Beach reservoir.

As Golden Beach Energy is proposing using the Golden Beach reservoir for long term gas storage and extraction, the reservoir will be maintained as high pressure for the life of the field. Previous impact assessments by Cape Energy have stated that the gas reservoir is considered very unlikely to be in direct pressure communication with any shallow onshore aquifers and any pressure depletion due to production from the field is considered at best to be connected to the regional LaTrobe Group aquifers by indirect and tortuous paths. The assessment found that whilst it was considered possible that gas production will contribute to overall pressure depletion in the regional LaTrobe aquifers, it will not directly affect the onshore extension of these regional aquifers.

Surface works onshore

Regional groundwater resources are unlikely to be affected by the pipeline or Gas Plant due to the shallow nature of excavation required to prepare and install the infrastructure. Whilst there may be a temporary diversion of surface water flow during construction, it is proposed that reinstatement and rehabilitation of the pipeline disturbance area will be comprehensive and will not alter groundwater in any way.

Subsurface works offshore

Wells will be fully cased down to the Golden Beach gas reservoir, isolating any shallower water zones from impact. The integrity of casing and cementation will be confirmed via pressure tests.

The Golden Beach gas reservoir is in contact with a regionally extensive aquifer system in sandstones of the Latrobe Group. This aquifer has experienced depletion in pressure due to extensive water production over time. The Golden Beach gas project will not contribute to this depletion for two reasons:

1. In contrast to annual gas production of ~350PJ per year for the Gippsland Basin overall, the total volume of gas to be produced is minor. For example, GBE intends to produce ~40PJ of gas in its blow down phase (~ 2 years) and maybe as much as 60 – 70PJ over the life of the entire project.
2. In contrast to regional oil production which co-produces large volumes of water, no water production in combination with Golden Beach gas is contemplated or necessary. Pressure in the regional aquifer is helpful to the gas storage and delivery mechanism at the Golden Beach field and GB Energy intends to operate the field in a manner that maintains it over time.

As further design details are resolved, and as noted in Section 20, water management will be subject to further studies.

The storage phase will see the cycling of gas with no ongoing nett impact on the regional aquifer.

Could environmental values (beneficial uses) of water environments be affected?

☒ NYD ☒ No ☒ Yes If yes, identify waterways/water bodies and beneficial uses (as recognised by State Environment Protection Policies)

The State Environment Protection Policy (Waters) (SEPP) identifies a range of beneficial uses of water environments. These include:

- Aquatic ecosystems;
- Water suitable for aquaculture;
- Water based recreation;
- Water suitable for human consumption;
- Cultural and spiritual values;
- Water suitable for industrial and commercial use;
- Water suitable for agriculture; and
- Water suitable for the consumption of fish, crustacea and molluscs.

The proposed Project has the potential to negatively affect the following beneficial uses on a temporary or localised basis:

- Aquatic ecosystems – for example, temporary and localised impacts due to generation of underwater sound, discharge of cuttings during drilling (smothering/toxicity),
- Water based recreation – for example, temporary exclusion from amenity beaches or underwater noise during drilling
- Water suitable for commercial use – for example, temporary and localised potential disruption to fisheries from underwater sound during drilling
- Water suitable for agriculture, aquaculture and industry – for example, sedimentation of waterways, water quality for stockwatering and irrigation, groundwater quality for bores.

Impacts on beneficial use will be mitigated by:

- Appropriate selection of major waterway crossings using trenchless techniques;
- Construction of trenched waterways will occur during no flow or low flow;
- Appropriate sediment and control measures will be implemented for all waterways;
- All trenched waterways will be reinstated in accordance with the CEMP and works on waterways permits; and
- Consultation with commercial and recreational fishers
- and other recreational activities in relation to project activities.

Could aquatic, estuarine or marine ecosystems be affected by the project?

☐ NYD ☐ No ☒ Yes If yes, describe in what way.

Preliminary risk assessments have been conducted – an onshore risk assessment for the construction of the plant and pipeline; and a preliminary risk assessment for the offshore marine ecosystems. These preliminary risk assessments as presented in **Attachment 07** and **Attachment 08** are to be further expanded upon in an ENVID workshop to support the full EES and will be supported by performance standards/mitigation measures.

These risk assessments considered the impact of project construction and operational activities impacting on native aquatic species and habitats (for example, soil disturbance, vegetation clearance, vehicle/vessel movements; drilling, pipelaying, wellhead and pipelines operations and management of planned and unplanned emissions and discharges).

Management commitments are set out in detail to treat impacts and risks to identified sensitivities and these will be captured in operational documentation in detail for the duration of this project.

Is there a potential for extensive or major effects on the health or biodiversity of aquatic, estuarine or marine ecosystems over the long-term?

☒ No ☐ Yes If yes, please describe. Comment on likelihood of effects and associated uncertainties, if practicable.

See **Attachment 07** (Onshore Environmental Risk Assessment) and **Attachment 08** (Marine Environmental Risk Assessment)

The preliminary risk assessments did not identify any potential for extensive or major effects on the health or biodiversity of aquatic, estuarine or marine ecosystems over the long term. The residual risk score was evaluated across both risk assessments to be LOW for all aspects of the activity (drilling and ongoing wellhead and pipeline operations) with the industry best practice standard control measures proposed.

Is mitigation of potential effects on water environments proposed?

☐ NYD ☐ No ☒ Yes If yes, please briefly describe.

The project management commitments for the protection of estuarine aquatic species and habitats set out requirements to implement specific controls in operational documentation, require construction environmental risk analysis prior to commencement, and conducted only in accordance with approved Works on Waterways permits.

In relation to offshore marine ecosystems, the preliminary risk assessment has identified environmental performance standards (avoidance, mitigation and management measures) for each phase of the project (exploration/appraisal, subsea operations) including measures for EPBC physiological and pathological

impacts, marine notifications, chemical selection processes for drilling cuttings and cement; management of waste under MARPOL; Invasive Marine Species; and management of unplanned hydrocarbon releases (spill response).

Other information/comments? (e.g. accuracy of information)

None

14. Landscape and soils

Landscape

Has a preliminary landscape assessment been prepared?

☒ No ☐ Yes If yes, please attach.

A preliminary landscape assessment is not considered necessary for the project as the visual impact of construction will be temporary, the pipeline will be buried, and there will be minimal above ground infrastructure. Please refer to **Attachment 02** for a preliminary layout of the Gas plant which will contain above ground structures.

Is the project to be located either within or near an area that is:

- **Subject to a Landscape Significance Overlay or Environmental Significance Overlay?**

☐ NYD ☐ No ☒ Yes If yes, provide plan showing footprint relative to overlay.

Two Environmental Sensitivity overlays (ESO1 and ESO2) are present within the project extent. The purpose of ESO1 (Coastal and Gippsland Lakes Environs) is listed in the Wellington Planning Scheme as:

- To ensure that the development of land is compatible with the environmentally sensitive coastal area, including the Gippsland Lakes.
- To conserve and enhance the environmental quality of the coastal area.
- To protect and enhance the natural beauty of the coastal landscape.
- To protect and enhance the visual amenity and landscape of the coastal area.
- To minimise the risk of erosion, pollution, and destruction by fire.
- To minimise the impact of human activities on the ecological values of the coastal and lakes environments

The purpose of ESO2 (Wetlands) is listed as:

- To protect and enhance the ecological, habitat, aesthetic, scientific, floristic, faunal, cultural,educational, and recreation values of wetlands through the control of development.
- To implement obligations under international, national, State, or other agreements to protect andenhance plant and animal species and habitats.

A Significant Landscape Overlay (SLO1 – Ninety Mile Beach) is present on the coastal fringe of the project extent. The purpose of this overlay is listed in the Wellington Planning Scheme as:

- To strengthen and protect indigenous coastal vegetation and ensure that it is the dominant feature of the landscape at the coastal edge.
- To protect locally significant views and vistas, including natural and unbuilt views along Ninety Mile Beach.
- To ensure that development in and around existing settlements does not impact on the characteristics of the landscape, including the natural and unbuilt character along Ninety Mile Beach.
- To reduce the visual impact of buildings and structures at the coastal edges of large settlements.
- To minimise any increase in development visible above the dunes and coastal vegetation outside settlements, when viewed from the beach, foreshore or offshore.
- To avoid buildings set high on dunes or development that will be visible on the skyline.
- To minimise the visual impact of signage and infrastructure adjacent to Ninety Mile Beach or inareas of high visibility.
- To protect landscape character and attributes that are consistent with the Aboriginal cultural heritage values of the area.

- To recognise, and protect, the landscape of the Ninety Mile Beach as a place of significant Aboriginal cultural heritage value.

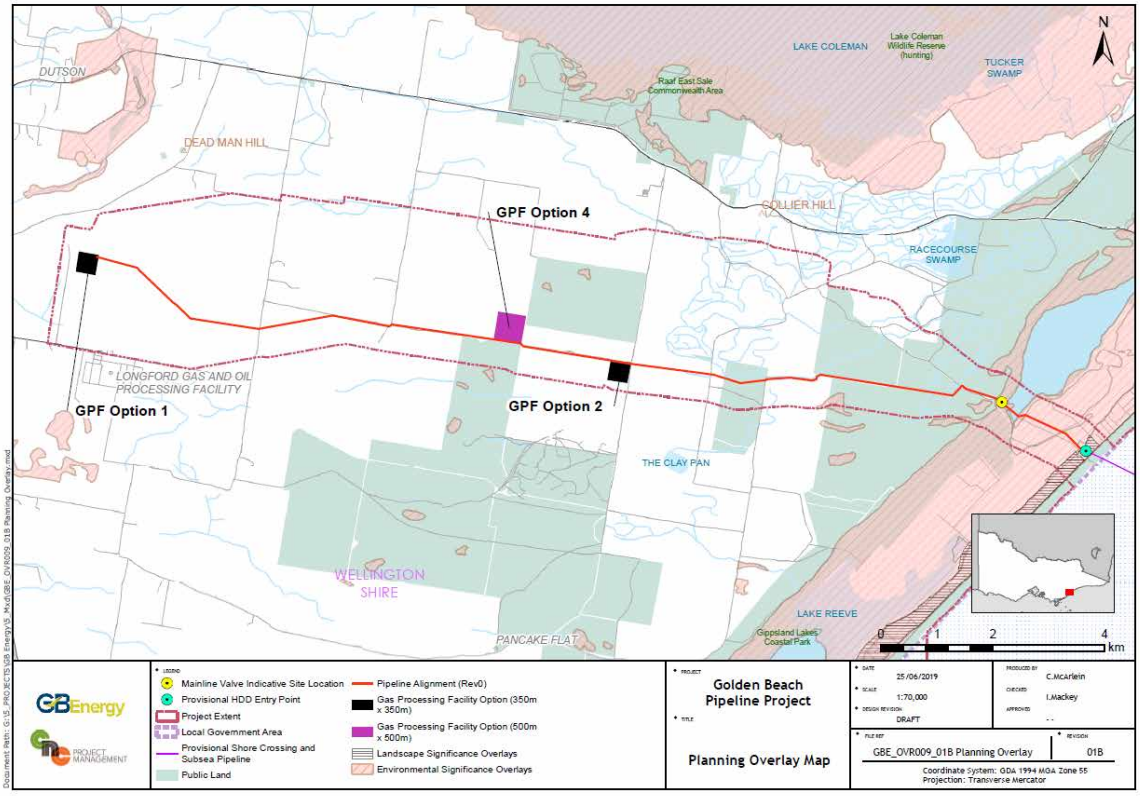

Figure 12. Significant Landscape Overlay and Environmental Significance Overlays

- **Identified as of regional or State significance in a reputable study of landscape values?**
  ☐ NYD ☐ No ☒ Yes If yes, please specify.

Lake Reeve has been identified as an area of State Geomorphological significance. See Reserves and Marine Protected Areas in Section 8.

- **Within or adjoining land reserved under the *National Parks Act 1975*?**
  ☐ NYD ☐ No ☒ Yes If yes, please specify.

Lake Reeve falls within the Gippsland Lakes Coastal Park which is designated as a Coastal Park under the National Parks Act 1975 (Vic).

- **Within or adjoining other public land used for conservation or recreational purposes?**
  ☐ NYD ☒ No ☐ Yes If yes, please specify.

The project extent intersects the Gippsland Lakes Coastal Park. The Coastal Crown Land in the project extent is also anecdotally used for four-wheel driving, camping, hunting and other forms of informal recreation.

Is any clearing vegetation or alteration of landforms likely to affect landscape values?
☐ NYD ☐ No ☒ Yes If yes, please briefly describe.

Construction and operation of the pipeline and Gas Plant is unlikely to materially impact on landscape values as the proposed infrastructure will be constructed on pre-disturbed land. Clearing of vegetation will be minimised and any alteration of local landform will be temporary and minor in nature.

Activities that may create temporary visual impacts from construction include the following:

- Clearing vegetation and stripping of topsoil to allow construction;
- Vehicle/machinery turn-around areas;
- Temporary stockpiles of excavated soil, pipeline or construction materials; and
- Temporary storage facilities.

The Construction ROW will be reinstated following construction and rehabilitation will be monitored so that there will be no significant change or alteration to landscape values.

Is there a potential for effects on landscape values of regional or State importance?
☐ NYD ☒ No ☐ Yes Please briefly explain response.

Whilst the section of proposed pipeline construction through Lake Reeve is within Gippsland Lakes Coastal Park, the impact to this section will be low due to the site selection (i.e. area of existing disturbance adjacent to a vehicle track and Gippsland Water infrastructure) and temporary nature of construction activity (pipeline will be buried).

Is mitigation of potential landscape effects proposed?
☐ NYD ☐ No ☒ Yes If yes, please briefly describe.

- GBE will prepare landscape planning principles that will be provided to the successful contractor to adopt during design and construction to ensure that landscape values within the Project Extent are thoroughly considered and impacts minimised.
- A site-specific assessment will be undertaken during the detailed assessment phase to determine precise impacts on any identified landscape values and site-specific significance. Planning principles will be applied to identified sites or areas to demonstrate minimisation of Project impact.
- GBE will prepare soil management guidelines that are consistent with best practice (International Erosion Control Association Guidelines, APGA CoEP) for the construction contractor to comply with during planning and construction of the proposed work.
- GBE will identify 'problem' soils through available mapping sources and include specific management measures in the soil management guidelines for the construction contractor to comply with during planning and construction of the proposed work.
- Construction Contractors will be required to prepare a Construction Environmental Management Plan that will outline how they propose to comply with any nominated landscape planning principles.

Other information/comments? (eg. accuracy of information)

None

Note: A preliminary landscape assessment is a specific requirement for a referral of a wind energy facility. This should provide a description of:

- The landscape character of the site and surrounding areas including landform, vegetation types and coverage, water features, any other notable features and current land use;
- The location of nearby dwellings, townships, recreation areas, major roads, above-ground utilities, tourist routes and walking tracks;
- Views to the site and to the proposed location of wind turbines from key vantage points (including views showing existing nearby dwellings and views from major roads, walking tracks and tourist routes) sufficient to give a sense of the overall site in its setting.

Soils

Is there a potential for effects on land stability, acid sulfate soils or highly erodible soils?
☐ NYD ☐ No ☒ Yes If yes, please briefly describe.

Refer to Section 7 for a description of the soils present within the project area.

Well established soil management and erosion control measures will be implemented through the project CEMP to prevent and minimize soil erosion during construction. Reinstatement and rehabilitation management measures in the CEMP will ensure soils are adequately reinstated and previous land use is restored post construction.

Acid Sulphate Soils (ASS)

Exposure or disturbance of ASS has been identified as a potential threat to the coastal region. **Figure 13** shows the approximate extent of ASS, these soils are typically located in coastal flood plains and are known to exist in the south west near Seaspray where the Tasmanian Gas Pipeline crosses the flats at the southern end of Lake Reeve.

A soil investigation will be undertaken to ground truth the presence or absence of Acid Sulphate Soils in accordance with the EPA Publication 655.1. Should ASS be present an Acid Sulphate Soils Management Plan will be developed and implemented during construction. As part of this investigation the presence or absence of other potential soil constraints such as highly erodible soils will be identified and management measures identified for implementation during construction.

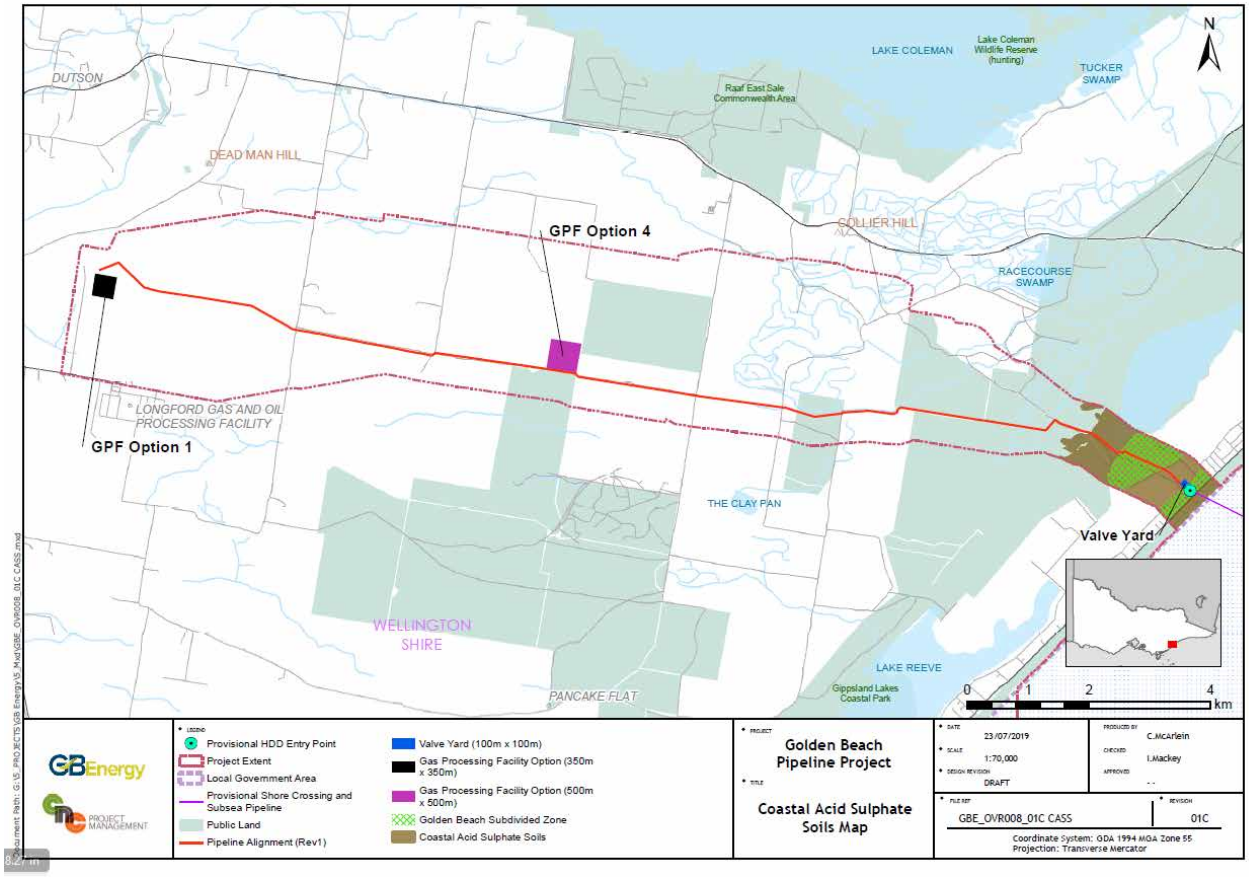

Figure 13 - Coastal Acid Sulfate Soils

Are there geotechnical hazards that may either affect the project or be affected by it?

☒ NYD ☒ No ☒ Yes If yes, please briefly describe.

There are no identified geohazards along the pipeline route from desktop investigations performed to date. Earthquake activity is noted in the Gippsland region, albeit at relatively low levels, with the Rosedale Fault System the nearest fault line sitting a number of kilometres to the north of the route.

Ground shaking from seismic events will need to be considered in the design especially in areas with low shear stress soils such as the Lake Reeve crossing. Other geohazards such as sinkholes associate with karst formation, landslip area, etc are not anticipated within the project extent.

Other information/comments? (e.g. accuracy of information)

None

15. Social environments

Is the project likely to generate significant volumes of road traffic, during construction or operation?

☐ NYD ☒ No ☐ Yes If yes, provide estimate of traffic volume(s) if practicable.

During the 12-14 month construction phase (2-4 months pipeline, 10 months gas plant) the estimated traffic / vehicle movements are estimated to be as follows:

- Pipe delivery to ROW, 132 truck movements (over project duration)
- Machinery floats, 30 truck movements (over project duration)
- Other deliveries, 50 truck movements (over project duration)
- Crew vehicles, 30 vehicles travelling to/from site daily

During operations minimal traffic is expected. They will comprise monthly patrols along the pipeline and weekly / semi-weekly visits to the gas plant. The plant will be manned from 8am to 5pm, Monday to Friday and on call as required.

Offshore it is expected that the vessels required within the project extent would comprise:

- Drilling - 1 drill rig, 2 support vessels.
- Pipelay - 1 pipe lay barge, 1-2 support vessels
- Operations - 1 platform support vessel doing wellhead observation/inspection once every year.

Is there a potential for significant effects on the amenity of residents, due to emissions of dust or odours or changes in visual, noise or traffic conditions?

☐ NYD ☒ No ☐ Yes If yes, briefly describe the nature of the changes in amenity conditions and the possible areas affected.

There are 22 dwellings within the project extent. Refer to **Figure 14** for the location of these dwellings in relation to the project area.

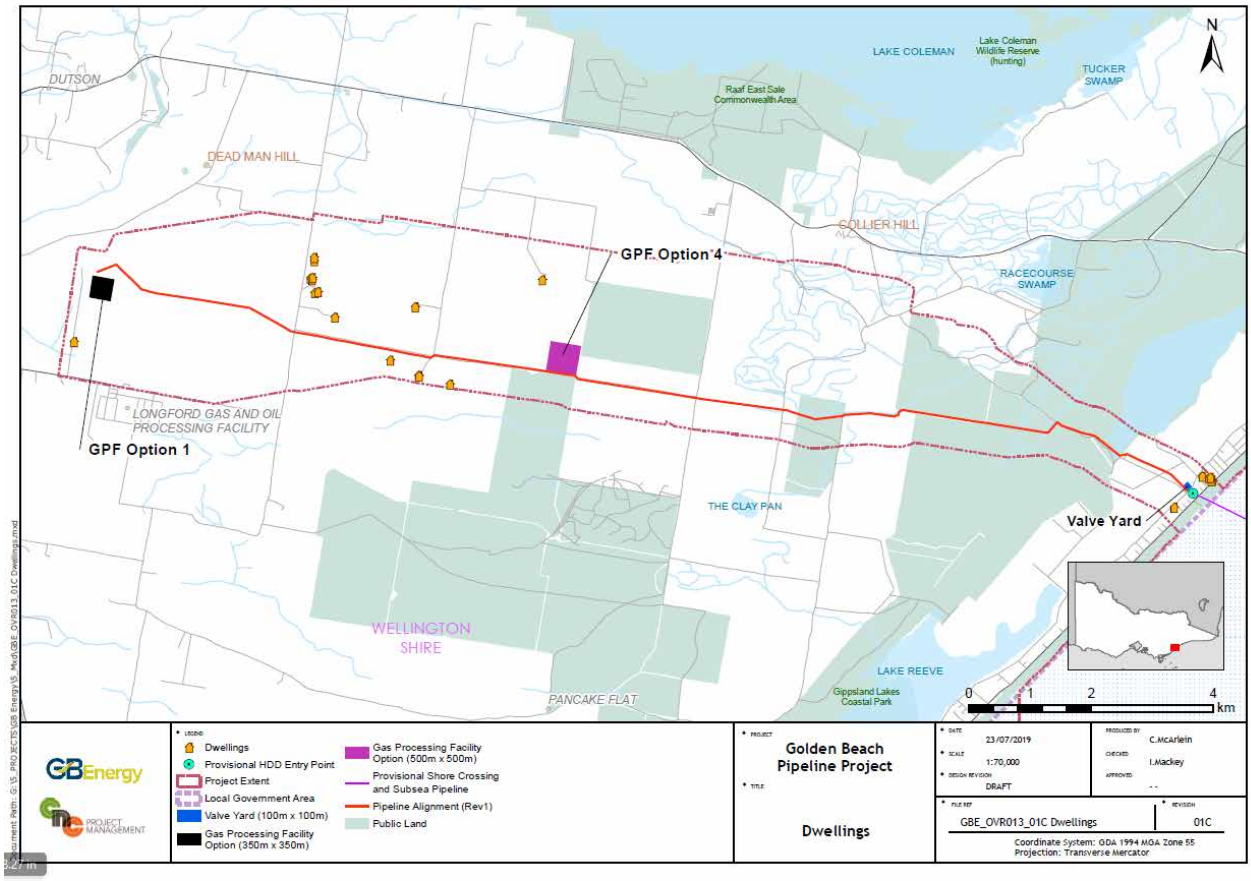

Figure 14 – Dwellings in relation to the project area

Construction activities are likely to produce minor, temporary impacts to local residents due to the nature of pipeline construction.

Air Emissions

Construction activities have the potential to impact on air quality of the local area and sensitive receptors, including residential and farming properties. Activities potentially affecting air quality can include:

- Emissions generated by the use of machinery and equipment;
- Wind action on stockpiles and disturbed areas creating dust;
- Onshore drilling activity that may create dust from dry soils; and
- Topsoil stripping, rock extraction and transportation (e.g. earth moving machinery, materials digging, loading, dumping, haul truck tyre/unsealed road interaction, unsealed roads, bench and face areas and materials spillage from haul trucks).

Key air environmental issues:

- Odour emissions;
- Temporary reduction of amenity associated with dust;
- Aeolian erosion;
- Inconvenience to sensitive receptors such as residents and construction workforce; and
- Generation of greenhouse gases and other reportable emissions.
-

Construction will be planned and designed in accordance with the following industry standards and reference material:

- EPA Publication 480: Environmental Guidelines for Major Construction Sites (EPA, 1996)
- Australian Pipelines and Gas Association Code of Environmental Practice – Onshore Pipelines (APGA, 2013).
-

Outcomes:

- Minimal impacts on the community and the construction workforce

- Minimal impacts on flora and fauna

Visual, Noise and Vibration

Construction activities will generate noise and vibration, creating the potential to cause 'nuisance impact' to adjoining properties. Major noise sources that may potentially generate 'nuisance' noise include:

- Construction truck and vehicle movements;
- Earth moving equipment;
- Pumps and generators;
- Ancillary plant and equipment;
- Reversing beepers; and
- As the work progresses along the construction ROW, noise impacts will be short lived at any one location. Typical trenching typically progresses at a rate of 800m-2km per day.
- Well clean up and testing

Key Environmental Issues:

- Disturbance to local residents and other land users.
- Disturbance to livestock and wildlife.
-

Industry Standards and Reference Material:

- EPA Publications 1411: Noise from Industry in Regional Victoria (Oct 2011).
- AS1055.1-1997 Acoustics: Description and measurement of environmental noise.
- AS 2436-1981 Guide to noise control on construction, maintenance and demolition site.
-

Outcomes:

- Minimal construction and operational noise and vibration impacts on adjacent residents and other land users.
- Minimal construction and operational noise impacts on wildlife and livestock.

Traffic

Traffic assessment and management is an important component of pipeline planning and construction as pipeline projects have the potential to significantly alter local traffic regimes.

Key Environmental Issues:

- Safety hazard resulting from increased traffic
- Traffic impact on flora, fauna and cultural heritage
- Soil erosion and degradation on the RoW and on access tracks
- Reduction in air quality and visual amenity
- Increased noise and vibration from increased traffic

Industry Standards and Reference Material:

- Approved Traffic Management Plan
- Collaboration with road authorities, councils and communities to develop appropriate traffic management strategies
- EPA Publication 480: Environmental Guidelines for Major Construction Sites (EPA, 1996)
- Australian Pipelines and Gas Association Code of Environmental Practice – Onshore Pipelines (APGA, 2013).
- Civil Contractor's Federation guidelines 'A Guide for Machinery Hygiene for Civil Construction' (CCF, 2011).

Outcomes:

- Minimal disturbance from traffic to flora, fauna and cultural heritage
- Minimal soil erosion and degradation

Operational activities will have minimal impact on local residents due to the passive nature of the pipelines and valves associated with the project. There will be some noise and air emissions associated with the ongoing operation and subsequent decommissioning of the Gas Plant that will be further evaluated when detailed designs are completed and subject to a noise assessment [refer to Section 20].

The nearest dwelling to any of the proposed locations for the Gas Plant is 750 m away (dwelling is currently 250 m from the APA GasNet facility and 750 m from the Esso Longford Gas Plant). All other dwellings are greater than 3 km from any of the proposed Gas Plant options. The cumulative noises effects on dwellings from the proposed activity in relation to the Gas Plant and potential future decommissioning activities will be further evaluated as noted in Section 20.

Is there a potential for exposure of a human community to health or safety hazards, due to emissions to air or water or noise or chemical hazards or associated transport?

☐ NYD ☒ No ☐ Yes If yes, briefly describe the hazards and possible implications.

The plant and pipeline will be designed in accordance with the relevant Australia Standards and a HAZOP study will be completed to verify the safety of the design.

The Safety Instrumentation System (SIS) will ensure that the hazard is controlled in a safe manner in the event of an uncontrolled release to protect operation personnel and the general public from injury.

The radiation zone for the controlled release of hydrocarbons (cold vent of flare) will be demarcated and delineated. Operational noise will be minimised with the use of vent silencers, compressor exhaust silencers and sound proofing enclosures.

Water by-product from the reservoir will be treated on-site to meet the relevant Australian Standards and discharged to a holding dam, to grade or to the Gippsland Water treatment facility. All vessels containing untreated water will be bunded to contain an uncontrolled release.

Chemicals will be managed in accordance with the relevant Safety Data Sheet and Australian Standards and will be stored on site in an appropriately sized bunded dangerous goods container.

Is there a potential for displacement of residences or severance of residential access to community resources due to the proposed development?

☐ NYD ☒ No ☐ Yes If yes, briefly describe potential effects.

It is not anticipated that any proposed construction or operational activity would require displacement of residences or severance of residential access to community resources.

Are non-residential land use activities likely to be displaced as a result of the project?

☐ NYD ☐ No ☒ Yes If yes, briefly describe the likely effects.

There will be a temporary displacement of land use along the proposed pipeline disturbance corridor during construction but not during operations.

The proposed pipeline will be located predominantly on agricultural land. Prompt reinstatement of the construction right of way will ensure that that land use activities can resume soon after completion of construction. The timing of construction will be considerate of landholders' land use activities. Consultation is underway and is being conducted in accordance with a comprehensive consultation plan.

Ancillary impacts including: Laydown/ storage areas for pipe, machinery and equipment; Access points/ temporary access; Vehicular turnarounds; Installation of pipeline marker signs to provide a visual above-ground indication of buried infrastructure will be designed and located to avoid impacts on local land use. The Gas Plant will require a longer-term displacement of land as there will be above ground infrastructure, machinery and equipment on site for the duration of the operation life of the asset.

Do any expected changes in non-residential land use activities have a potential to cause adverse effects on local residents/communities, social groups or industries?

☐ NYD ☒ No ☐ Yes If yes, briefly describe the potential effects.

Changes to non-residential land use activities will be temporary only and are not expected to permanently affect local residences/communities, social groups or industries. Construction is expected to be completed

within twelve months (please refer to **Attachment 01**) with pipeline construction moving progressively along the alignment through that time.

The project has developed and is implementing a consultation plan with local residents/communities to ensure that local residents/communities or industries are consulted and continuously updated, and mitigation measures are in place. This consultation will continue to include marine environment users such as commercial fisheries and other marine users.

Oil and gas have been a major wealth creator in the region, but employment levels have fallen significantly due to field decline and improved operational efficiencies. GBE intends to engage with local residents/communities to ensure that all opportunities for employment are explored.

Is mitigation of potential social effects proposed?

☐ NYD ☐ No ☒ Yes If yes, please briefly describe.

The following mitigation measures are proposed to ensure that impact to social effects is minimised during the construction, operation and decommissioning of the Project:

- Continue engagement of directly affected landholders to ensure minimisation of impact on their land and businesses during construction of the Project.
- Continue community engagement to ensure that local residents, businesses and social groups remain informed of the Project's progress during planning, construction and operation.
- Pro-actively engage with local business to promote opportunities to get involved with the construction and operation of the project creating a social benefit.

Other information/comments? (eg. accuracy of information)

None

Cultural heritage

Have relevant Indigenous organisations been consulted on the occurrence of Aboriginal cultural heritage within the project area?

☐ No If no, list any organisations that it is proposed to consult.
☒ Yes If yes, list the organisations so far consulted.

Gunaikurnai Land & Waters Aboriginal Corporation (GLaWAC) have been actively consulted in the planning of the Project. Please refer to **Attachment 06** for a summary of conversation between the GBE representatives and the GLaWAC.

GLaWAC will continue to be engaged in their capacity as Registered Aboriginal Party as the Project progresses through cultural heritage assessment in accordance with the Aboriginal Heritage Act 2006.

What investigations of cultural heritage in the project area have been done?
(attach details of method and results of any surveys for the project & describe their accuracy)

An initial Heritage Assessment and predictive model has been prepared by Andrew Long and Associates (**Attachment 10**). The impacts on cultural heritage during construction and operations as it relates to cultural heritage will be evaluated further as outlined in Section 20.

Standard assessment of the proposed disturbance envelope is proposed to commence in Q3 2019 which will inform whether complex assessment is required and, if so, the most appropriate methodology to be used.

Is any Aboriginal cultural heritage known from the project area?

☐ NYD ☐ No ☒ Yes If yes, briefly describe:

- Any sites listed on the AAV Site Register
- Sites or areas of sensitivity recorded in recent surveys from the project site or nearby
- Sites or areas of sensitivity identified by representatives of Indigenous organisations

A total of twenty-one registered Aboriginal cultural heritage places were located within the one kilometre of the activity area. It is noted that the Victorian Aboriginal Heritage Register contains culturally sensitive information that is not publicly accessible. In accordance with section 146 of the Aboriginal Heritage Act

2006, the Register can only be accessed by certain people or organisations. As the EES referral will become a public document, a map of the specific locations of the cultural heritage places identified in the register has not been included. These places are predominantly made up of shell middens in proximity to the coast and Lake Reeve immediately inland (**Attachment 10** – Cultural Heritage Desktop Assessment).

The remaining places comprise stone artefact scatters of relatively low density, in one instance associated with a midden. Ancestral remains were identified in association with a midden on the western shore of Lake Reeve.

The majority of places known in the region are concentrated towards the eastern end of the activity area with only very limited quantities having been identified in the hinterland. This may reflect patterns of occupation and land use or alternatively may in some part be an artefact of survey coverage to date.

Four registered places are situated with the activity area, again at its eastern extremity:

- 8321-0124 Dutson Downs 4
- 8321-0148 Delray Beach 6
- 8321-0149 Delray Beach 7
- 8321-0150 Delray Beach 8

These places comprise three shell middens situated between the coast and Lake Reeve and a single artefact scatter on the west side of Lake Reeve. The three shell middens were originally recorded as being a poor state of preservation and subsequent inspections by Aboriginal Victoria staff have failed to re-identify these places and as such in unclear what the current state of preservation of these places is. Similarly, the artefact scatter, a single quartz artefact was not able to be re-located.

Are there any cultural heritage places listed on the Heritage Register or the Archaeological Inventory under the *Heritage Act 1995* within the project area?

☐ NYD ☒ No ☐ Yes If yes, please list.

No cultural heritage places listed on the Heritage Register or the Archaeological Inventory have been identified (**Attachment 10** – Desktop cultural heritage assessment).

There are no heritage overlays in the study area under the Wellington Planning Scheme. A search of the Victorian Heritage Database did not identify any significant heritage places or objects in the area and a search of the marine heritage register did not identify any shipwrecks or other maritime cultural heritage sites in the vicinity of the Project.

Is mitigation of potential cultural heritage effects proposed?

☐ NYD ☐ No ☒ Yes If yes, please briefly describe.

The following mitigation measures are proposed to ensure that impact to cultural heritage is minimised during the construction, operation and decommissioning of the Golden Beach Gas Project:

- Continue to engage the GLaWAC throughout the Aboriginal Cultural Heritage assessment process to ensure that any intangible heritage is identified and to maintain and respect their connection to country.
- Use the predictive model to inform the standard assessment of the activity area.
- Following completion of standard assessment, conduct a thorough complex assessment if uncertainty remains over potential to impact Aboriginal cultural heritage.
- Avoid all known registered sites
- Ensure a cultural heritage management plan is prepared that contains accidental discovery protocols and provision for induction of project personnel.
- Incorporate recommendations and commitments from the CHMP into the construction contract.
- Provide a project delivery structure that ensures that CHMP recommendations and commitments are implemented.

Other information/comments? (eg. accuracy of information)

None

16. Energy, wastes & greenhouse gas emissions

What are the main sources of energy that the project facility would consume/generate?

☒ Electricity network. If possible, estimate power requirement/output

The electricity load is expected to be anywhere from 400kW to 1500 kW, depending on what the storage injection/withdrawal requirements are on the day.

☒ Natural gas network. If possible, estimate gas requirement/output ……...

The gas consumption is expected to be anywhere from 0 GJ/d to 4320 GJ/d, depending on what the storage injection/withdrawal requirements are on the day

☒ Generated on-site. If possible, estimate power capacity/output ……..

☒ Other. Please describe.

Please add any relevant additional information.

What are the main forms of waste that would be generated by the project facility?

☒ Wastewater. Describe briefly.

☒ Solid chemical wastes. Describe briefly.

☒ Excavated material. Describe briefly.

☒ Other. Describe briefly.

Please provide relevant further information, including proposed management of wastes.

Wastewater will be generated during operations and disposed of via a trade waste agreement with Gippsland Water at the local facility. Other waste expected would be typical construction related waste (packaging, pallets, offcuts, used coating or lubricant containers, spent welding rods and general putrescible waste). These wastes are to be managed in accordance with a waste management plan, with all wastes that cannot be recycled being sent to a licenced waste management facility.

What level of greenhouse gas emissions is expected to result directly from operation of the project facility?

☒ Less than 50,000 tonnes of CO_2 equivalent per annum

☒ Between 50,000 and 100,000 tonnes of CO_2 equivalent per annum

☒ Between 100,000 and 200,000 tonnes of CO_2 equivalent per annum

☒ More than 200,000 tonnes of CO_2 equivalent per annum

Please add any relevant additional information, including any identified mitigation options.

A greenhouse gas emissions assessment will be completed with the final EES referral document as identified in Section 20. The plant piping volumes and estimated of gas venting are being considered in FEED design to input into this assessment.

17. Other environmental issues

Are there any other environmental issues arising from the proposed project?

☒ No ☒ Yes If yes, briefly describe.

18. Environmental management

What measures are currently proposed to avoid, minimise or manage the main potential adverse environmental effects? (if not already described above)

☒ Siting: Please describe briefly

☒ Design: Please describe briefly

☒ Environmental management: Please describe briefly.

☒ Other: Please describe briefly

Please see proposed approach to site identification and route refinement described above and control measures identified in the risk assessments provided in **Attachments 07 and 08**.

19. Other activities

Are there any other activities in the vicinity of the proposed project that have a potential for cumulative effects?

☒ NYD ☒ No ☒ Yes If yes, briefly describe.

Offshore from Ninety Mile Beach, adjacent to the Project, CarbonNet are currently in the process of investigating the potential for establishing an offshore commercial-scale carbon capture and storage (CCS) network. The proposed project intends to transport CO_2 via a system of pipelines and inject it into deep underground, offshore storage sites. This project could potentially follow a similar timeline for construction based on its current progression. Cumulative effects include noise, visual amenity, however there will only be visual impact during the construction phase.

Onshore, the Gas Plant will be situated south of the town of Longford, near existing gas facilities. Jemena operate a gas facility in moderate proximity to the proposed site including the cumulative effects of noise and greenhouse emissions. As the Golden Beach gas is relatively dry and sweet with the Basis of Design assuming no less than 96% methane and no hydrocarbon liquids, the greenhouse emissions emitted by the Gas Plant are predicted to be minimal. The cumulative effects of the activity in relation to other known activities will be further evaluated as outlined in Section 20.

20. Investigation program

Study program

Have any environmental studies not referred to above been conducted for the project?

☒ No ☒ Yes If yes, please list here and attach if relevant.

Has a program for future environmental studies been developed?

☒ No ☒ Yes If yes, briefly describe.

A full suite of supporting studies has been identified for the project, to assist with assessing potential impacts from construction and operation of the project. Studies will be commissioned to support the FEED and Detailed Design process. Studies identified to date include:

- Biodiversity – marine;
- Biodiversity – targeted terrestrial;
- Cultural heritage;
- Energy efficiency, security, affordability and safety;
- Greenhouse Gas Assessment;
- Noise and Vibration;
- Social, economic, amenity and land use;
- Soil & Contamination;
- Visual Impact; and
- Water and catchment values.

Consultation program

Has a consultation program conducted to date for the project?

☒ No ☒ Yes If yes, outline the consultation activities and the stakeholder groups or organisations consulted.

See **Attachment 06a, b, and c.**

Has a program for future consultation been developed?
✕ NYD ✕ No ✕ Yes If yes, briefly describe.

Authorised person for proponent:

I, Tim Baldwin, Chief Executive Officer (GB Energy), confirm that the information contained in this form is, to my knowledge, true and not misleading.

Signature _____

Date 30/07/2019

Person who prepared this referral:

I, Sean Dunn, Regulatory and HSE Manager (GB Energy), confirm that the information contained in this form is, to my knowledge, true and not misleading.

Signature _____

Date 30/07/2019